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Effect of Nitrogen and Phosphorus on Fruiting, Earliness and Yield

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ABSTRACT: This study investigates the influence of nitrogen and phosphorus levels on fruiting, earliness, and yield in agricultural crops. The experiment was conducted using a specific crop species, and varying nitrogen and phosphorus concentrations were applied to the soil or growing medium. The growth parameters, fruiting patterns, time to maturity, and overall yield were monitored and analyzed to determine the effects of these essential nutrients.The results revealed a significant impact of nitrogen and phosphorus on fruiting, earliness, and yield. Increased nitrogen levels positively affected vegetative growth, resulting in enhanced plant height, leaf size, and overall plant vigor. This vigorous growth, in turn, contributed to increased fruit production and yield. However, excessive nitrogen application led to delayed fruit maturation, reduced fruit quality, and decreased overall yield. Therefore, an optimal nitrogen level is crucial to balance vegetative growth and reproductive processes for maximizing fruiting and yield.Phosphorus demonstrated a similar positive influence on fruiting and yield. Higher phosphorus concentrations promoted root development, flowering, and fruit set, leading to earlier fruit maturation and increased overall yield. Adequate phosphorus availability facilitated nutrient uptake and transport, thus supporting the metabolic processes essential for successful fruit development.Moreover, the study explored the interaction between nitrogen and phosphorus. It was observed that an appropriate balance between these nutrients contributed to the highest fruit quality, earliness, and yield. The synergistic effect of nitrogen and phosphorus emphasized the importance of nutrient management strategies in optimizing crop productivity.These findings provide valuable insights into the role of nitrogen and phosphorus in regulating fruiting, earliness, and yield in agricultural crops. Understanding the optimal nutrient requirements and their interactions can guide farmers and agronomists in implementing effective fertilization practices to enhance crop performance and maximize economic returns. Further research is warranted to elucidate the underlying physiological mechanisms and refine nutrient management approaches for specific crop species and growing conditions.

KEYWORDS: Yield, nitrogen, phosphorus, vegetative growth, Fruit weight

INTRODUCTION:

For increased fruit yield of cucurbitaceous crops,recommended 25 tons of well-rotten FYM per hectare followed by top dressing of 20 kg N/ha at the start of fruiting.220-230 FYM/ha with 18 to 27 kg N/ha for obtaining higher yield in ash gourd.In bitter gourd, the application of 50 kg N/ha+ 56 kg P20g/ha gave maximum fruit yield while potash

failed to effect the fruit yield together,For bottle gourd, improvement in fruit yield with seed soaking in nitrogen solution (0,05%) for 24 hours while the fertilizer dose of 22 to 25 kg N, 20 to 60 kg P205 and 17,5 kg to 44,0 kg Ko/ha in bottle gourd for increased 2 fruit yield, a combination of 100 kg N/ha+MH at 400 mg/1 enhanced fruit number and yield in bottle gourd whereassuggested 95 kg N/ha for obtaining good yield in bottle gourd. However, recommended 56 kg N, 28 kg P and 28 kg K/ha in addition to 20-25 cart load of FXM for increased fruit yield in bottle gourd,

In cucumber, no difference in yield by applying ammonium nitrate urea of ammonium nitrate. However, found improvement in fruit yield with application of 20-40 t/ha of organic-neolithicfertilizers and subsequent top dressing with 60-80 kg N, 70-150 kg P20 and 60-150 kg Ko/ha, reported that fruit yield greatest with N at 300 mg/1 when applied foliar to cucumber plants, while comparing the methods of applying fertilizers suggested that single application of nitrogen in steppe and forest soil is preferable while split application of nitrogen in flood plain soils is desirable in cucumber for higher yield. Similarly, comparing the effect of different fertilizers, Edney et al. (1983) found the highest yield of cucumber with Alan ap as compared with mono ammonium phosphate or triple phosphate, the high concentration of N alone did not improve the yield of cucumbers, These results are in agreement with the later highest yield of good quality cucumber plants when fertilized with 10-5- 20-6 fertilizer containing N, P, K and Mg, respectively.In cucumber, early sown crop of cucumber showed a high requirement of N and P as compared with late own crop, first yield of cucumber could be raised to maximum with application of PK+ cut straw (30% v/v) N at 150 kg/m². Similarly increased fruit yield of cucumber with application of 1452 lb of 18 kg N + 25 kg Ko/acre, the application of Nitro- pho aka (a slow-release fertilizer) was superior to other manures in increasing the fruit yield by 8-10%.. (1978) recommended 60 kg N/fedden for satisfactory production of good quality cucumber while Adams (1978) reported that fruit yield of cucumber rose as the N content of the liquid feed increased over a range of 50-300 mg/1 provided that Mg and K were not limiting. However, Williams (1978) reported increased yield of cucumber with 280 kg N/ha. These results differed with those who recorded slight improvement in fruit yield with the application of NPK fertilizer and grown at wider spacing (40 cm between plants), that top dressing with 5 g N/m2 per week starting 4 weeks after planting until 3 weeks before harvest gave higher yield in cucumber while A lot of work has been done on the manurial and fertilizer requirement of muskmelon in the recent past in different parts of India and abroad, Recent studies conducted by increasing N application from 30 to 120 kg/ha increased total fruit yield by 11 and 20% , respectively. However, a fertilizer dose of 100 kg N/ha, 60 kg P 0g/ha and 60 kg K.0/ha for muskmelon highest total yield of muskmelon with 150 mg N/1 when applied to leaves through trickle irrigation, Similarly fertilizer and irrigation studies conducted by maximum fruit yield was obtained with irrigation at 0.9 PEC (Pan Evaporation Coefficient, 1.e. 55.5 mm of irrigation water) + 40 kg N/ha which is in conformity

However maximum yield of watermelon with the application of 140 kg Sulphur coated effect on fruit yield while absence of N in fertilizer mixture or high rates of N produced similar yields, application of N increased the size of fruit, %age of fruit set, early and total marketable yield under the conditions of heavy rain- fall while split application of NPK fertilization improved

number of melons fruits, marketable weight, average weight of fruit and early yield by 20%, 25%, 4% and 70%, respectively as compared with single application, Anonymous (1960) obtained a maximum yield of watermelon with the use of organic fertilizers than inorganic fertilizers while Everett (1961) found improvement in fruit yield with super phosphate application in watermelon.

MATERIALS AND METHODS

FRUITING AND YIELD CHARACTERISTICS:

1. Number and weight of fruits per plant from early yields: The sum of first four packings made for summer and the sum of first seven pickings taken for rainy season was summed up to calculate the number and weight of fruits (kg/plant) from early yield.

2. Early yield(kg/plot): Sum total weight of four pickings in summer and seven pickings in rainy seasons was considered as early fruit yield in kg/plot.

3. Early yield (a/ha): The early fruit yield per plot was later converted to give early yield in quintal/ hectare(q/ha).

4. Total number and weight of fruits per plant: The number and weight of all the eight pickings made up to 4th June 1984 in summer season crop and fourteen pickings taken upto 2nd November 1985 in rainy season crop was added and total fruit number and yield per plant was calculated in kg per plant,

5. Total yield (kg/plot): The sum total of eight pickings in summer season and fourteen pickings in rainy season crop was considered as total plant yield in kg per plot.

6. Total yield (a/ha): The total fruit yield per plot was later converted to give total yield in quintal per hectare (g/ha).

7. Fruit length and diameter(cm): The female flowers were tagged and fruit length and diameter was recorded five days after the date of tagging.

8. Fruit weight (g/fruit): Weight of first 10 fruits harvested per treatment was summed upto calculate average fruit weight in gram.

EXPERIMENTAL RESULTS

1. Fruiting and yield characteristics

The fruit yield has been divided into early and total yield depending upon the number of pickings from which early and total yield was estimated in both the seasons. The yield of first four pickings taken from summer season and sum of first seven pickings taken from rainy season was considered as early yield whereas the total weight of all eight pickings in summer and four- teen pickings in rainy season taken up to in summer season and in rainy season were considered as total yield,

1.1 Number of fruits harvested per plant from early yield: The differences in the number of fruits per plant from early yield were significant due to nitrogen, phosphorus and their interaction in both the seasons fruits per plant from early yield was harvested with 50 kg N/ha followed by 75 kg N/ha (193) while control plants gave 1 east number of fruits per plant from early yield, Among phosphorus levels 20 kg Poha showed significant increase in the number of fruits per plant from early yield as compared to least in control. The interaction between nitrogen andphosphorus levels in summer season revealed that 50 kg N/ha+ 20 kg P20/ha gave maximum number of fruits per plant from early yield whereas least number of fruits per plant from early yield was obtained from unfertilized control. Similar trend of number of fruits per plant from early yield was noticed in rainy season where maximum number of fruits per plan from early yield was harvested from 50 kg /ha while least number of fruits per plant was harvested from 75 kg N/ha.

1.2 Early yield per plant (g): The differences in the early fruit yield per plant were significant due to nitrogen, phosphorus and their interaction in both the seasons, In summer season 50 kg N/ha gave highest early fruit yield (233.58 g) per plant followed by 75 kg N/ha (201.44 g) per plant whereas lowest early fruit yield (96.00 g) per plant was recorded in control. Among phosphorus levels 20 kg P/ha gave highest early fruit yield (189.52 g) per plant which was at par with 40 kg P/ha (183.0 g) but was significantly higher than 0 kg PP/ha (157.50 g). The interaction between nitrogen and phosphorus level showed that a combination of 50 kg N/ha+ 20 kg P0g/ha gave highest early yield (275.10 g) per plant whereas lowest early yield (75,00 g) per plant was recorded in unferti1ized control.

1.3 Early fruit yield per plot (kg): Similar trend of early fruit yield (kg/plot) (Table 19) in both the seasons was observed from early yield (g/plant). Among the nitrogen level 50 kg N/ha raised the early fruit yield to maximum in summer season (3.74 kg/ plot) and rainy season (6.63 kg/plot) whereas control had least early fruit yield both in summer season (1.54 kg/ plot) and rainy season (3.55 kg/plot), Among phosphorus levels 20 kg P ha gave maximum early fruit yield (3.03 kg/ plot and 5.07 kg/plot in summer and rainy season respectively. The interaction effect of N and P showed that application of 50 kg N/ha 20 kg Pos/ha gave maximum early fruit yield in summer season (4,40 kg/plot) and rainy season (7.43 kg/plot). Least early fruit yield was recorded from unfertilized control plots (1.20 kg/plot) in summer season and 25 kg N/ha +0 kg P 0g/ha (2,67 kg/plot) in rainy season,

1.4 Early fruit yield per hectare (c): The response of nitrogen, phosphorus and their inter action in respect of early fruit yield (g/ha) vas similar as in kg/plot. In summer and rainy season 50 kg N/ha gave the highest early fruit yield (16.82 g/ha and 29,84 g/ha, respectively) while least was observed in control in both the seasons (6,92 /ha in summer and 15.98 g/ha in rainy season). Among phosphorus levels 20 kg P/ha gave highest early fruit yield in summer (13,65 g/ha) and rainy season (22,82 g/ha) while lowest was observed in their controls in summer and rainy seasons (11.34 and 15.83 g/ha, respectively). The inter- action effect indicated that 50 kg N/ha+ 20 kg Pg/ha in summer and rainy season gave highest early fruit yield (19.80 and 33.44 q/ha, respectively) while the least early fruit yield was recorded in control.

1.5 Total fruit yield per plant (kg): Total yield per plant was significantly influenced by nitrogen, phosphorus levels in both the season. Interaction between nitrogen and phosphorus was also significant in both the seasons. In summer season maximum total fruit yield (0.55 kg/plant) was obtained from 50 kg N/ha which was at par with 75 kg N/ha (0.47 kg/ plants) whereas lowest total fruit yield (0.24 kg/plant) was recorded in control and was at par with 25 kg N/ha (0.34 kg/plant), Among phosphorus levels 40 kg Po gave maximum total fruit yield (0.43 kg/plant) which was at par with 20 kg P20g/ha (0,38 kg/plant). The inter- action effect in summer season showed that combination of 50 kg N/ha+ 20 kg P0g/ha gave the maximum total fruit yield (0.60 kg/plant) which was significantly higher than 50 kg N/ha +0 kg P205/ha (0,48 kg/plant) but was at par with 50 kg N/ha+ 40 kg P0g/ha (0.57 kg/ plant).

CONCLUSION

In the present study, application of 50 kg N/ha significantly increased the number and weight of fruits per plant from early yield during both the seasons. Further, application of 75 kg N/ha decreased the early fruit yield over 50 kg N/ha in both the season, Phosphorus application at 20 kg/ha improved the fruit number and yield over no

phosphorus application in both the season except for fruit number per plant which was maximum with 40 kg P205/ha in rainy season, The interaction effect between nitrogen andphosphorus level a showed that 50 kg N/ha+ 20 kg P205/ha gave maximum early yield by number and weight in both the seasons while 50 kg N/ha + 40 kg P205/ha in rainy season gave a maximum number of fruits from early yield. These observations are similar to those in muskmelon casing cucumber in watermelon. The increase in number and weight of fruit per plant from early yield due to nitrogen and phosphorus application (50 kg N/ha + 20 kg P205/ha in both the seasons) was because of more number of secondary branches which bear female flowers in abundance at the lowest node numberappearing early resulting in early fruit set and yield. A similar trend of increased early yield (kg/plot) and (g/ha) was observed with 50 kg N/ha+ 20 kg P0/haas compared with unfertilized control, Experimental findings of the present studies showed that application of 50 kg N/ha enhanced total fruit yield in terms of number and weight of fruits in both the seasons, Increasing the level of phosphorus showed an increasing trend for fruit number and total yield, the highest being with 40 kg P0g/ha in summer season while 20 kg P 0g/ha in rainy season, The interaction effect showed that 50 kg N/ha+ 20 kg Pos/ha gave the maximum number and total fruit yield in both the seasons. It may further be revealed that the application ofyield attribute has been significantly improved by 50 kg N/ha + 20 kg P205/ha in both seasons.

Improvement in fruit weight leading to increased fruit yield of cucurbit with different nitrogen and phosphorus Levels has been reported by some workers. The possible explanation of improved fruit yield with nitrogen and phosphorus application in sponge gourd crops is explained on the basis of the established fact that a balance dose of nitrogen and phosphorus resulted in assimilation of more CHD, which results in the increase of the vegetative growth. These carbohydrates when translocated to the reproductive organs undergo hydrolysis and get converted into free reducing sugars which ultimately help in increased fruit set, size and enlargement of the fruit, a different theory that nitrogen favors the effective utilization of CD and other organic fraction resulting in the fruiting and fruit development. Thus the mole of nitro- gen and phosphorus is justified in increasing the fruit number, fruit length and diameter. Moreover, the soil of experimental field was deficient in available phosphorus, therefore, phosphorus application was found to be beneficial for obtaining higher yield of sponge gourd.

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