Academic Journal of Plant Sciences 3 (2): 71-78, 2010
ISSN 1995-8986

Nitrogen and Phosphorus Efficiency on the Growth and Yield Attributes of *Capsicum*

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Abstract: A field experiment was conducted at the research farm of Sher-e-Bangla Agricultural University, Dhaka during November 2009 to March 2010 to study the effects of nitrogen and phosphorus on the growth and yield of capsicum. The treatments were 4 levels of N (0, 50, 100 & 150 kg ha^{-1} designated as N_0, N_{50}, N_{100} & N_{150}, respectively) and 3 levels of P (0, 30 & 60 kg ha^{-1} designated as P_0, P_{30} & P_{60}, respectively). Plant height at first flowering and at first harvest, number of branches at first flowering nd number of fruits per plant increased significantly with increasing nitrogen doses up to 100 kg N ha^{-1}. However, plant height at final harvest and number of branches at first and final harvest increased significantly up to 150 kg N ha^{-1} (N_3 treatment). On the other hand plant height at first flowering and number of branches at first harvest increased significantly with increasing levels of P up to the treatment P_1 (30 kg P ha^{-1}), whereas plant height and number of branches at final harvest and number fruits per plant enhanced significantly up to the treatment P_2 (60 kg P ha^{-1}). Considering the combined effect of nitrogen and phosphorus, the maximum plant height at final harvest were obtained from N_2P_2 (100 kg N + 60 kg P ha^{-1}). On the other hand, maximum number of fruits per plant was found in the treatment combination N_3P_1 (150 kg N + 30 kg P ha^{-1}).

Key words: Capsicum · Nitrogen · Phosphorus · Plant height · Fruit number · Branches

INTRODUCTION

Sweet pepper botanically referred to as the genus *Capsicum* is the member of *Solanaceae* family. It is the native to the Tropical South America and Brazil [1]. The genus *Capsicum* consists of about 20 species and only four species are under cultivation, out of which *C. pendulum* and *C. pubescens* are restricted to the South and Central America. The other two species such as *C. annum* and *C. frutescens* are commonly cultivated throughout the world. *C. annum* is the most commonly cultivated species and all green chilies in the market and most of the dry chilies belong to this species. Sweet pepper is relatively non-pungent or less pungent with thick flesh and it is the world second most important vegetables after tomato [2]. Sweet pepper is also known as bell pepper, green pepper or *capsicum*. It may be used as cooked or raw salad. The leaves are also consumed as salad, soups or eaten with rice [3]. It was also discovered to be a good source of medicinal preparation for black vomit, tome for gout and paralysis [4].

In Bangladesh, half of the population is under the poverty level and suffer from various health problems. Severity of malnutrition and iron deficiency is the highest among female and all groups of children. Approximately one million Bangladeshi children have clinical signs of vitamin A deficiency and more than 9, 00,000 children less than six years of age suffer from some degree of xeropthalmia and over 30,000 children go under blind each year due to severe vitamin A deficiency [5]. Almost 80 % of blind children come from landless household. Recent studies have been shown that vitamin A is not only important to prevent blindness but also has impact on digestion of food, child morbidity and mortability. It is estimated that about 90 % of the population suffers from vitamin C deficiency. Sweet pepper has little energy value but the nutritive value of sweet pepper is high especially for vitamin A and vitamin C.

Fertilizer is one of the major factors of crop production. Among the factors, nitrogen is very much essential for good plant establishment and expected growth [6]. Use of inorganic and organic fertilizers has amused a great significance in recent years in vegetables production, for two reasons. Firstly, the need for continued increase production and per hectare yield of vegetables requires the increase amount of nutrients. Secondly, the results of a large number of experiments on inorganic and organic fertilizers conducted in several

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countries reveal that inorganic fertilizer alone can not sustain the productivity of soils under highly intensive cropping systems [7].

Optimum dose of fertilizers increase the proper growth, development and maximize the yield of sweet pepper. Slow release fertilizers also hold great promise for the production of solanaceous vegetables such as eggplant and tomato [8]. They found that slow-release fertilizers produce 92 t ha^{-1} of tomato, compared to only 42 t ha^{-1} when ordinary commercial fertilizers are used. Many researchers of different countries of the world have been attempting for commercial cultivation of sweet pepper under various cultural aspects. Fertilizer rate influenced quantity and quality of *capsicum*. Fertilizer rates influenced capsaicin content and colour of powdered pepper [9]. Therefore, the present investigation was undertaken to study the effect of nitrogen and phosphorus fertilizers on growth and yield of sweet pepper and to find out the optimum dose of fertilizer for successful growth and yield of sweet pepper.

MATERIALS AND METHODS

The experiment was conducted at the research farm of Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka during November 2009 to March. The experimental field is located at 23°77' N latitude and 90°3' E longitude with an elevation of 1.0 meter above sea level. The soil of the experimental field belongs to the Tejgaon series of the Madhupur Tract Agro Ecological Zone (AEZ) 28. The General soil type of the experimental field is Deep Red Brown Terrace Soil. Topsoil is silty clay loam in texture. Organic matter content is very low (0.89%) and soil pH is 5.8.

California Wonder, a high yielding variety of capsicum *(Capsicumannum* Lin.) developed by the scientist of the USA (United State of America) of California State. Now it is more or less found in our country but not cultivated for the commercial purposes.

The land selected for nursery beds was well drained and sandy loam type soil. The area was well prepared and converted into loose friable and dried mass to obtain fine tilth. Two seed beds were prepared for raising the seedlings and seeds were sown in each seed bed on 25 October 2009. Complete germination of the seeds took place with 6 days after seed sowing.

The experiment was laid out in a Randomized Complete Block Design (RCBD) with three replications of each fertilizer treatment combinations. Fertilizer treatments consisted of 4 levels of N (0, 50, 100 and 150 kg N ha^{-1} designated as N_0, N_{50}, N_{100} and N_{150}, respectively) and 3 levels of P (0, 30 and 60 kg P ha^{-1}designated as P_0, P_{30} and $P_{60,}$ respectively). There were 12 treatment combinations. The treatment combinations were as follows:

N_0P_0 = Control (without N and P application)
N_0P_{30} = 0 kg N ha^{-1} + 30 kg P ha^{-1}
N_0P_{60} = 0 kg N ha^{-1} + 60 kg P ha^{-1}
$N_{50}P_0$ = 50 kg N ha^{-1} + 0 kg P ha^{-1}
$N_{50}P_{30}$ = 50 kg N ha^{-1} + 30 kg P ha^{-1}
$N_{50}P_{60}$ = 50 kg N ha^{-1} + 60 kg P ha^{-1}
$N_{100}P_0$ = 100 kg N ha^{-1} + 0 kgP ha^{-1}
$N_{100}P_{30}$ = 100 kg N ha^{-1} + 30 kg P ha^{-1}
$N_{100}P_{60}$ = 100 kg N ha^{-1} + 60 kg P ha^{-1}
$N_{150}P_0$ = 150 kg N ha^{-1} + 0 kg P ha^{-1}
$N_{150}P_{30}$ = 150 kg N ha^{-1} + 30 kg P ha^{-1}
$N_{150}P_{60}$ = 150 kg N ha^{-1} + 60 kg P ha^{-1}

The land operation was completed on 27 November 2009. The N, P, K and Zn fertilizers were applied according to Fertilizer Recommendation Guide (BARC, 1997) through urea, triple super phosphate (TSP), muriate of potash (MP) and zinc oxide, respectively. One third (1/3) of whole amount of Urea and full amount of MP, TSP and zinc oxide were applied at the time of final land preparation for each treatment. The remaining Urea was top dressed in two equal installments- at 20 days after transplanting (DAT) and 50 DAT respectively. Healthy and uniform sized 30 days old seedlings were taken separately from the seed bed and were transplanted in the experimental field on 28 November 2009 maintaining a spacing of 55 cm and 27.5 cm between the rows and plants, separately. The seedlings were watered after transplanting. Shading was provided by piece of banana leaf sheath for three days to protect the seedlings from the direct sunshine. When the seedlings were established, the soil around the base of each seedling was pulverized. Gaps filling, weeding, irrigation and pest management were done as per requirement. Fruits were harvested at 8 days intervals during maturity to ripening stage. The maturity of the crop was determined on the basis of size of fruits. Harvesting was started from 6 March 2010 and completed by 29 March 2010.

The collected data were statistically analyzed by using the ANOVA technique. The test of significance of all parameters was done. The Duncan`s Multiple Range Test (DMRT) with Least Significant Difference value was determined with appropriate levels of significance and the means were tabulated. The mean comparison was carried out by DMRT technique.

RESULTS AND DISCUSSION

Plant Height at First Flowering: Plant height at first flowering of *Capsicum* was significantly increased by increasing different level of nitrogen (Table 1). The highest plant height at first flowering (17.14 cm) was found with 150kg N ha^{-1} which was statistically similar with that of 100kg N ha^{-1} and the lowest plant height at first flowering (14.97 cm) was observed in control treatment which was statistically similar to 50kg N ha^{-1}. It was observed that plant height at first flowering stage increased gradually with the increment of nitrogen dose. This could be due to higher availability of N and their uptake that progressively enhanced the plant height at first flowering. This result is supported by Aliyu and Yusuf [10]. They stated that, greatest plant height, leaf numbers were obtained with 180 kg ha^{-1}. Plants reached 70-80% of their total height in the first 60 days of growth, being tallest with the highest N rate. This result was found by Chailloux *et al.* [11].

There was a significant effect among the different levels of phosphorus in respect of plant height at first flowering (Table 2). Plant height at first flowering increased with increasing level of phosphorus. The highest plant height at first flowering (16.63 cm) was observed with 60 kg ha^{-1} and the lowest plant height at first flowering (15.18 cm) was found in control treatment. Similar results were found by Akinrinde and Adigun [12]. They carried on an experiment on crop growth and found that the 150 mg P_2O_5 kg^{-1} level produced the tallest plants (40.0 cm) at the 6th week.

The treatment combination of nitrogen and phosphorus had significant effect on plant height at first flowering (Table 3). The highest plant height at first flowering (17.76 cm) was found in N_3P_2 treatment The lowest plant height at first flowering (14.49 cm) was observed in control treatment (N_0P_0). These results showed that higher dose of phosphorus and higher dose of nitrogen were influential nutrients for plant height at first flowering. Similar results were found by Sarma *et al.* [13]. They stated that plant height (27.25 cm) increased significantly with 150:75:75 kg NPK ha^{-1}.

Plant Height at First Harvest: With the increase of nitrogen level plant height at first harvesting stage of *Capsicum* was significantly increased (Table 1). The highest plant height at first harvesting stage (24.29 cm) was found with 150kg N ha^{-1} which was statistically similar with 100 kg N $ha^{-1}$and the lowest plant height at first harvesting stage (22.05 cm) was obtained in the control. It was observed that plant height at first harvesting stage increased gradually with the increment of nitrogen dose. This must be due to higher availability of N and their uptake that gradually enhance the plant height at first harvesting stage.

With the increase of phosphorus level plant height at first harvesting stage of *Capsicum* was not significantly increased (Table 2). The highest plant height at first harvesting stage (24.01 cm) was observed with 60 kg ha^{-1}. Similar result was found by Alabi [14]. He stated phosphorus levels significantly increased pepper plant height, number of leaves per plant up to 125 kg P ha^{-1}.

Table 1: Effect of nitrogen on yield attributes of *Capsicum*

Treatment	Plant height at first flowering (cm)	Plant height at first harvest (cm)	Plant height final harvest (cm)
N_0	14.97 b	22.05 c	26.59 c
N_1	15.66 b	23.53 b	27.44 c
N_2	16.57 a	23.87 ab	29.73 b
N_3	17. 14 a	24. 29 a	31. 62 a
$LSD_{0.05}$	0.90	0.56	1.28
CV (%)	5.69	6.50	7.55

Figure in column, having same letter(s) do not differ significantly at 5% level
NS = Non significant
N_0 =Control (without N), N_1 = 50 kg N ha^{-1}, N_2=100 kg N ha^{-1}, N_3=150 kg N ha^{-1}

Table 2: Effect of phosphorus on yield attributes of *Capsicum*

Treatment	Plant height at first flowering (cm)	Plant height at first harvest (cm)	Plant height final harvest (cm)
P_0	15.18 b	23.14	27.86 b
P_1	16.44 a	23.15	28.49 b
P_2	16. 63 a	24. 01	30. 17 a
$LSD_{0.05}$	0.78	NS	1.11
CV (%)	5.69	6.50	7.55

P_0 = Control (without P), P_1 = 30 kg P ha^{-1}, P_2 = 60 kg P ha^{-1}
Figure in column, having same letter(s) do not differ significantly at 5% level
NS = Non significant

Table 3: Interaction effect N and P on yield attributes of *Capsicum*

Treatment	Plant height at first flowering (cm)	Plant height at first harvest (cm)	Plant height at final harvest (cm)
N_0P_0	14.49 d	21.12 c	25.38 e
N_0P_1	14.73 cd	21.79 bc	26.39 de
N_0P_2	15.69 bcd	23.23 abc	27.99 cd
N_1P_0	14.76 cd	22.78 abc	27.64 cde
N_1P_1	16.44 abc	23.69 abc	29.37 bc
N_1P_2	15.77 bcd	23.93 abc	28.91 bc
N_2P_0	14.69 d	22.98 abc	27.94 cd
N_2P_1	17.37 ab	24.00 abc	31.87 a
N_2P_2	17.60 a	24.11 abc	32. 00 a
N_3P_0	16.78 ab	23.87 abc	25.77 de
N_3P_1	17.33 ab	24.85 ab	30.92 ab
N_3P_2	17. 76 a	25. 00 a	31.93 a
$LSD_{0.05}$	1.55	2.58	2.22
CV (%)	5.69	6.50	7.55

Figure in column, having same letter(s) do not differ significantly at 5% level
NS = Non significant

Table 4: Effect of nitrogen on yield attributes of *Capsicum*

Treatment	Number of branches /plant at first flowering stage	Number of branches/plant at first harvest	Number of branches/plant at final harvest
N_0	4.42 c	7.95 c	14.21 d
N_1	5.27 b	8.35 c	15.20 c
N_2	6.41 a	10.22 b	16.48 b
N_3	6. 85 a	11. 69 a	17. 98 a
$LSD_{0.05}$	0.49	0.63	0.52
CV (%)	8.82	6.78	7.32

Figure in column, having same letter(s) do not differ significantly at 5% level
NS = Non significant
N_0=Control (without N), N_1=50 kg N ha^{-1}, N_2 =100 kg N ha^{-1}, N_3=150 kg N ha^{-1}

Table 5: Influence of phosphorus on yield attributes of *Capsicum*

Treatment	Number of branches /plant at first flowering stage	Number of branches/plant at first harvest	Number of branches/plant at final harvest
P_0	5.61	8.89 b	15.60 b
P_1	5.75	9.79 a	15.89 b
P_2	5.86	9.97 a	16.41 a
$LSD_{0.05}$	NS	0.55	0.45
CV (%)	8.82	6.78	7.32

Figure in column, having same letter(s) do not differ significantly at 5% level
NS = Non significant
P_0 = Control (without P), P_1 = 30 kg P ha^{-1}, P_2 = 60 kg P ha^{-1}

Table 6: Interaction effect of nitrogen and phosphorus on yield attributes of *Capsicum*

Treatment	Number of branches/plant at first flowering stage	Number of branches/plant at first harvesting stage	Number of branches/plant at final harvesting stage
N_0P_0	4.31 f	8.97 bcd	13.93 f
N_0P_1	4.57 ef	7.00 e	14.12 ef
N_0P_2	4.39 f	7.87 de	14.57 ef
N_1P_0	5.43 de	9.12 bc	15.00 de
N_1P_1	5.65 cd	8.00 cde	14.97 de
N_1P_2	4.73 ef	7.93 cde	15.63 cd
N_2P_0	6.00 bcd	9.78 b	15.93 cd
N_2P_1	6.51 abc	9.00 bcd	16.00 c
N_2P_2	6.71 ab	11.87 a	17.50 b
N_3P_0	6.95 a	12. 00 a	18. 50 a
N_3P_1	7. 00 a	11.57 a	17.50 b
N_3P_2	6.50 ab	11.50 a	17.93 ab
$LSD_{0.05}$	0.86	1.10	0.90
CV (%)	8.82	6.78	7.32

Figure in column, having same letter(s) do not differ significantly at 5% level
NS = Non significant

Combined treatment of nitrogen and phosphorus had significant effect on plant height at first harvesting stage (Table 3). The highest plant height at first harvesting stage (25.00 cm) was found in N_3P_2 treatment. The lowest plant height at first harvesting stage (21.12 cm) was observed in control treatment (N_0P_0).

Plant Height at Final Harvest: Plant height at final harvesting stage of *Capsicum* was significantly increased with the increase of nitrogen level (Table 1). The highest plant height at final harvesting stage (31.62 cm) was found with 150 kg N ha^{-1} and the lowest plant height at final harvesting stage (26.59 cm) was found in the control. Plant height at final harvesting stage increased sequentially with the augment of nitrogen dose. Because to higher availability of N and their uptake that gradually enhance the plant height at final harvesting stage.

With the increase of phosphorus level, plant height at final harvesting stage of *Capsicum* was significantly increased (Table 2). Plant height at final harvesting stage increased with increasing level of phosphorus. The highest plant height at final harvesting stage (30.17 cm) was observed with 60 kg ha^{-1} and it was found that the lowest result (27.86 cm) was identified in the control treatment of phosphorus fertilizer.

Plant height at final harvesting stage with combined treatment of nitrogen and phosphorus had significant effect (Table 3). The highest plant height at final harvesting stage (32.00 cm) was found in N_2P_2 treatment. The lowest plant height final harvesting stage (25.38 cm) was observed in control treatment (N_0P_0). Similar results were found by Chauhan *et al.* [15]. They stated that among the various N and P combinations, 120 kg N + 60 kg P ha^{-1}recorded the greatest plant height (64.83 cm), number of leaves per plant. Similar results were also found by Sarma *et al.* [13]. They stated that plant height (27.25 cm), fruit number per plant (64.33), fruit weight (3.33 g) and yield (27.99 q ha^{-1}) of chilli increased significantly with 150:75:75 kg NPK ha^{-1}.

Number of Branches per Plant at First Flowering Stage: Number of branches per plant at first flowering stage of *Capsicum* was significantly increased with the increase of nitrogen level (Table 4). The highest number of branches per plant at first flowering stage (6.85) was found with 150 kg N ha^{-1} which was followed by (6.41) that of 100 kg N ha^{-1}and the lowest number of branches per plant at first flowering stage (4.42) was observed with control. Number of branches per plant at first flowering stage increased sequentially with the augment of nitrogen dose. So, because of higher availability of N and their uptake that gradually enhances the number of branches per plant at first flowering stage. Similar result was found by Aliyu and Yusuf [10]. They carried out a field trial with respect to N fertilizer application and greatest branches number was obtained with 180 kg ha^{-1}.

No significant differences were recorded for different level of phosphorus in terms of number of branches per plant at first flowering of *Capsicum* (Table 5). The number of branches per plant at first flowering stage (5.86) was the highest at the highest dose of P and the lowest result (5.61) was found in control treatment. Similar results were found by Alabi [14]. He found that number of branches per plant significantly increased with the increased of phosphorus levels up to 125 kg P ha^{-1}.

The combined treatment of nitrogen and phosphorus had significant effect in terms of number of branches per plant at first flowering stage (Table 6). The greatest umber of branches per plant at first flowering stage (7.00) was found in N_3P_1 treatment. The lowest number of branches per plant at first flowering stage (4.31) was observed in control treatment (N_0P_0).

Number of Branches per Plant at First Harvest: Number of branches per plant at first harvesting stage of *Capsicum* was significantly increased with the increase of nitrogen level (Table 4). The highest number of branches per plant at first harvesting stage (11.69) was found with 150 kg N ha^{-1} and the lowest number of branches per plant at first harvesting stage (7.95) was found under control. Number of branches per plant at first harvesting stage increased gradually with the augment of nitrogen dose.

Number of branches per plant at first harvesting stage increased with the increase of phosphorus of *Capsicum* significantly (Table 5). Number of branches per plant at first harvesting stage increased with increasing level of phosphorus. The greatest number of branches per plant at first harvesting stage (9.97) was observed with 60 kg P ha^{-1}followed by 30 kg ha^{-1}(9.79). It was found that the lowest result (8.89) was identified in the control treatment of phosphorus fertilizer.

In case of number of branches per plant at first harvesting stage the combined treatment of nitrogen and phosphorus had significant effect (Table 6). The highest number of branches per plant at first harvesting stage (12.00) was found in N_3P_0 treatment and the lowest number of branches per plant at first harvesting stage (7.00) was observed in control treatment (N_0P_0).

These results explained that higher dose of nitrogen and phosphorus was influential nutrients for increasing number of branches per plant at first harvesting stage.

Number of Branches per Plant at Final Harvest: Number of branches per plant at final harvesting stage of *Capsicum annum* was significantly increased with the increase of nitrogen level (Table 4). The highest number of branches per plant at final harvesting stage (17.98) was found with 150 kg N ha^{-1} and the lowest number of branches per plant at final harvesting stage (14.21) was found under control. Number of branches per plant at final harvesting stage increased gradually with the increase of nitrogen doses. For the reason of higher availability of nitrogen and their uptake that by turn increase the number of branches per plant at final harvesting stage.

Number of branches per plant at final harvesting stage of *Capsicum* increased significantly with the increase of phosphorus (Table 5). The highest number of branches per plant at final harvesting stage (16.41) was observed with 60 kg P ha^{-1}. The lowest result (15.60) was identified in the control treatment of phosphorus fertilizer.

Number of branches per plant at final harvesting stage showed significant effect due to combined treatment of nitrogen and phosphorus (Table 6). Number of branches per plant at final harvesting stage (18.50) was the highest in N_3P_0 treatment. The lowest number of branches per plant at final harvesting stage (13.93) was observed in control treatment (N_0P_0). These results showed that higher dose of nitrogen and phosphorus was influential nutrients for number of branches per plant at final harvesting stage. Similar result was found by Tumbare *et al.* [16]. They stated that plant height, numbers of branches per plant, yield and N and P uptake were recorded higher for 100% recommended N: P: K as fertigation and 70% N + 80% P and K.

Number of Fruits per Plant: The number of fruit per plant increased significantly with the increase of nitrogen level (Table 7). The highest number of fruits per plant (8.61) was found with 150 kg N ha^{-1} and the lowest number of fruits per plant (4.32) was found in control treatment. Number of fruits per plant increased gradually with the increase of nitrogen dose. Application of 100 kg N in combination with 25 kg P ha^{-1} recorded the highest number of fruits $plant^{-1}$ (Pundir *et al.,* 1999).

Table 7: Influence of nitrogen on number of fruits per plant of *Capsicum*

Treatment	Number of fruits/plant
N_0	4.32 c
N_1	6.02 b
N_2	8.23 a
N_3	8.61 a
$LSD_{0.05}$	0.61
CV (%)	9.12

Figure in column, having same letter(s) do not differ significantly at 5% level
NS = Non significant
N_0 =Control (without N), N_1 =50 kg N ha^{-1}, N_2 =100 kg N ha^{-1}, N_3=150 kg N ha^{-1}

Table 8: Influence of phosphorus on number of fruit per plant of *Capsicum*

Treatment	Number of fruits/plant
P_0	6.17 c
P_1	6.78 b
P_2	7.44 a
$LSD_{0.05}$	0.53
CV (%)	9.12

Figure in column, having same letter(s) do not differ significantly at 5% level.
NS = Non significant
P_0 = Control (without P), P_1 = 30 kg P ha^{-1}, P_2 = 60 kg P ha^{-1}

Table 9: Interaction effect of nitrogen and phosphorus on number of fruits per plant of *Capsicum*

Treatment	Number of fruits/plant
N_0P_0	3.50 g
N_0P_1	4.95 f
N_0P_2	4.50 fg
N_1P_0	5.12 ef
N_1P_1	6.12 de
N_1P_2	6.82 cd
N_2P_0	7.40 bc
N_2P_1	8.00 b
N_2P_2	9.30 a
N_3P_0	7.20 bcd
N_3P_1	9.50 a
N_3P_2	9.12 a
$LSD_{0.05}$	1.05
CV (%)	9.12

Figure in column, having same letter(s) do not differ significantly at 5% level
NS = Non significant

Nitrogen fertilization improved plant growth, but did not influence fruiting time. Moderate nitrogen applications (150 kg N ha^{-1}) gave best yields in most field trials (Vos *et al.,* 1997). This investigation was supported by other researchers [17-20]. Nitrogen at 240 kg ha^{-1}+ P at 180 kg ha^{-1} produced the highest mean number of fruits per plant (7.51) [21].

Number of fruit per plant increased with the increment of phosphorus of *capsicum* significantly (Table 8). The highest number of fruit per plant (7.44) was observed with 60 kg ha^{-1} of phosphorus fertilizer. It was found that the lowest number of fruit (6.17) per plant was identified in the control treatment.

Combined treatment of nitrogen and phosphorus had significant effect (Table 9) on number of fruit per plant. Number of fruit per plant (9.50) was the highest in N_3P_1 treatment. The lowest number of fruit per plant (3.50) was observed in control treatment (N_0P_0). From these results it was stated that higher dose of nitrogen and phosphorus was influential nutrients for number of fruit per plant. Srinivasan [21] reported that N at 240 kg ha^{-1}+ P at 180 kg ha^{-1} produced the highest mean number of fruits per plant (7.51). Shrivastava [21] found that the highest number of fruits/plant (10.66) were observed in plants treated with 250 kg N + 200 kg P + 200 kg K ha^{-1}.

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