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Effect of variety and phosphorus on the yield components and yield of groundnut

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Abstract

An experiment was carried out at the agronomy field laboratory of Bangladesh Agricultural University, Mymensingh to evaluate the effect of variety and phosphorus on the yield and yield components of groundnut. The experiment comprising of two groundnut varieties viz. BARI Cheenabadam-8 and BINA Cheenabadam-6 and four levels of phosphorus viz. 0, 20, 40 and 60 kg P ha^{-1}. The experiment was laid out in a randomized complete block design with three replications. The highest value of all the parameters e.g. leaf area index (2.02), dry matter (51.88 g plant^{-1}), number of primary branches plant^{-1} (10.70), number of secondary branches plant^{-1} (13.85), number of pegs plant^{-1} (64.35), number of total pods plant^{-1} (44.50), weight of 100-pods (94.66 g), weight of 100-seeds (44.47 g), shelling percentage (81.84%), seed yield (2.48 t ha^{-1}), pod yield (3.03 t ha^{-1}), stover yield (6.92 t ha^{-1}) and harvest index (30.45%) were recorded from BARI Cheenabadam-8 applied with 60 kg P ha^{-1}. The lowest value of all these parameters was found in BINA Cheenabadam-6 and with no applied phosphorus. It can be concluded that BARI Cheenabadam-8 should preferably be fertilized with 60 kg P ha^{-1} to obtain the highest yield

Key words: Leaf area index, total dry matter, shelling percentage, harvest index, yield

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Introduction

Groundnut is one of the principal economic crops of the world that ranks 13th among the food crops (Varnell and Mc-cloud, 1975). Groundnut is also known as earthnuts, peanuts, goobers, goober peas, pindas, jack nuts, pinders, manila nuts, g-nuts, and monkey nuts; the last of these is often used to mean the entire pod (Annadurai and Palaniappan, 2009). In Bangladesh, it is popularly known as ‘‘cheenabadam’’. Besides its food value, groundnut is a major oil seed crop. In Bangladesh, groundnut is grown area of 31769 hectare with a production of 53664 metric tons in *Rabi* and *Kharif* season (BBS, 2011). At present, it is cultivated in about 35,000 ha and 40,000 m tons of groundnuts are produced annually in the districts of the Gangetic delta viz. Noakhali, Faridpur, Kishoreganj, Patuakhali, and Rangpur districts. Groundnut seeds contain mainly non-dry oil and protein. Its seeds contain about 38-50% oil, 11.5% carbohydrate, 2.3% ash and 6% water. Groundnut cake is a rich food for cattle. It is also rich in vitamin B and E. The oil is used for cooking, and as margarine and vegetable ghee, and in confectioneries and pharmaceutical industries. Groundnuts are also eaten after roasting. Groundnuts are one of the major oilseed crops of Bangladesh, but yields are low when compared to the world average. Bangladesh produces only about 40% of its domestic oil consumption. Groundnuts are mostly used as ingredients for a number of industrially processed foods and contribute little to oil production.

Groundnut is a major crop in the char lands of Bangladesh, but because of poor yields, farmers derive a limited income from the crop. The productivity of groundnut depends on proper selection of variety, fertilizer management, environmental factors, metal contents in soil and other management practices (Uddin *et al.*, 2016). Proper doses of phosphorus fertilizer have vital effect on the yield of groundnut. Phosphorus (P) is the essential nutrient element for crop growth and yield. The most obvious effect of P is on the plant root system. The requirement of P in nodulating legumes is higher compared to non-nodulating crops as it plays a significant role in nodule formation and fixation of atmospheric nitrogen (Brady and Well, 2002). Due to the important role played by P in the physiological processes of plants, application of P to soil deficient in this nutrient leads to increase groundnut yield (Singh *et al.*, 2000). Phosphorus deficiency results in poor root development, poor pod setting and subsequently reduces pod yield (Jain *et al.*, 1990). Phosphorus plays an important role on number of nodules production, nodules dry weight and uptake of N, P and K (Ramesh *et al.*, 1997).

In addition to proper dose of phosphorus, a suitable variety of groundnut should be identified to increase its production. The yield of groundnut may be increased through appropriate combination of levels of phosphorus and variety. Though groundnut is cultivated in many parts of our country, very little research work has so far been conducted on the appropriate phosphorus fertilizer management for groundnut especially for BARI chinabadam-8 and BINA chinabadam-6 varieties. With the above background, a study was, therefore, undertaken to evaluate the yield performance of different varieties of groundnut and to optimize dose of phosphorus fertilizer for maximum yield of groundnut.

Materials and Methods

The research work was carried out at the Agronomy Field Laboratory, Bangladesh Agricultural University, Mymensingh. Geographically the field is located at $24^{0}75'$ N latitude and $90^{o}50'$ E longitude at the elevation of 18 m above the sea level (Khan, 1997). The topography of the field was medium high belonging to the Sonatola soil series of grey floodplain soil under the Agro-ecological Zone-9 (AEZ-9) named Old Brahmaputra Floodplain (UNDP and FAO, 1988). The experiment consisted of two varieties of groundnut/ cheenabadam such as BARI Cheenabadam-8, BINA Cheenabadam-6 and four levels of phosphorus fertilizer viz. 0, 20, 40 and 60 kg P ha^{-1}. The experiment was conducted in randomized complete block design with three replications. The land was ploughed and cross ploughed three times followed by laddering to obtain the desirable tilth. Whole experimental land was divided into unit plots following the design of experiment.

The crop was fertilized with urea, muriate of potash (MoP), gypsum, zinc sulphate and boric acid. The rates of urea, MoP, gypsum, zinc sulphate and boric acid were 80 kg ha^{-1}, 140 kg ha^{-1}, 150 kg ha^{-1}, 4.5 kg ha^{-1} and 5.88 kg ha^{-1}, respectively. Phosphorus fertilizer was applied according to experimental treatment. The source of phosphorus was triple superphosphate. Entire amount of all fertilizers were applied at final land preparation. The seeds of groundnut were sown in rows made by hand plough. The distance between row to row and seed to seed was 25 cm and 10 cm, respectively. Two weedings were done during the study period. Irrigation was given at the early stage of the crop because of absence of sufficient moisture in the field and the later stage there was no need of irrigation due to sufficient rainfall. *Cercospora* leaf spot of groundnut was noticed at the flowering stage. For this Bavistin 50 WP was sprayed @ 2g L^{-1} of water for 2 times at an interval of 10 days.

The crop was harvested with utmost care so that no pods were left in the soil. The pods were separated from the plants. Pods were sun dried for several days to record their yield plot^{-1}. The pod yields were then converted to hectare basis. Five plants from each plot excluding border plants were selected randomly for necessary data collection. The sample plants were uprooted carefully by digging the soil with a khurpi so that no pods were left in the soil. Later they were washed in water and sun dried. The data collected on different parameters were statistically analyzed to obtain the level of significance using the MSTATC-computer package programme developed by Russell (1986). The difference among treatment means were compared by Duncan's New Multiple Range Test (DMRT) at 5% level of probability (Gomez and Gomez, 1984).

Results and Discussion

Leaf *area index*: Leaf area index was significantly affected by variety (Table 1). Leaf Area Index of BARI Cheenabadam-8 (1.82) was higher than that of BINA Cheenabadam-6 (1.66). This happened due to genetic differences of the varieties. The effect of phosphorus on leaf area index was significant (Table 2). It was noted that leaf area index increased progressively with the increasing levels of phosphorus. Leaf area index was the highest (1.98) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg P ha^{-1}, respectively. The improvement of number of primary and secondary branches plant^{-1} was mainly responsible for the increased leaf area index in 60 kg P ha^{-1}. The result is in agreement with the findings of Jadhav and Narkhede (1983) who reported positive response of leaf area increases in groundnut with increasing levels of P fertilizer up to 60 kg P ha^{-1}. Interaction effect of variety and phosphorus on leaf area index was significant (Table 3). The highest leaf area index (2.02) was recorded from $V_1 \times P_4$ combination and the lowest leaf area index (1.37) was recorded from $V_2 \times P_1$ combination.

Total dry matter: Dry matter was significantly affected by variety (Table 1). Dry matter of BARI Cheenabadam-8 (48.87g plant^{-1}) was higher than that of BINA Cheenabadam-6 (46.06 g plant^{-1}). The effect of phosphorus on dry matter was significant (Table 2). Dry matter was the highest (50.45 g plant^{-1}) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg P ha^{-1}, respectively. The improvement of number of primary and secondary branches plant^{-1} and leaf area index were mainly responsible for the increased dry matter in 60 kg P ha^{-1}.Interaction effect of variety and phosphorus on dry matter was not significant (Table 3). However, the dry matter ranged from 44.11 to 51.88 g plant^{-1}.

Number of primary branches plant^{-1}: Number of primary branches plant^{-1} was significantly affected by variety (Table 1). The number of primary branches plant^{-1} of BARI Cheenabadam-8 (10.05) was higher than that of BINA Cheenabadam-6 (9.55). The effect of phosphorus on number of primary branches plant^{-1} was significant (Table 2). Number of primary branches plant^{-1} was the highest (10.55) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg P ha^{-1}, respectively. Interaction effect of variety and phosphorus on number of primary branches plant^{-1} was significant (Table 3). The highest number of primary branches plant^{-1} (10.70) was recorded from $V_1 \times P_4$ combination and the lowest number of primary branches plant^{-1} (8.70) was recorded from $V_2 \times P_1$ combination.

Number of secondary branches plant^{-1}: Number of secondary branches plant^{-1} was significantly affected by variety (Table 1). The number of secondary branches plant^{-1} of BARI Cheenabadam-8 (10.99) was higher than that of BINA Cheenabadam-6 (9.13). The effect of phosphorus on number of secondary branches plant^{-1} was significant (Table 2). Number of secondary branches plant^{-1} was the highest (12.32) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg P ha^{-1}, respectively. Interaction effect of variety and phosphorus on number of secondary branches plant^{-1} was significant (Table 3). The highest number of secondary branches plant^{-1} (13.85) was recorded from $V_1 \times P_4$ combination and the lowest number of secondary branches plant^{-1} (7.50) was recorded from $V_2 \times P_1$ combination.

Table 1. Effect of variety on the studied crop characteristics of groundnut

Variety (V)	Leaf area index (LAI)	Dry matter (g plant^{-1})	Primary branches plant^{-1}	Secondary branches plant^{-1}	No. of pegs plant^{-1}	Weight of 100-pods (g)	Weight of 100-seeds (g)	Seed yield (t ha^{-1})	Stover yield (t ha^{-1})	Harvest index (%)
V_1	1.82^a	48.87^a	10.05^a	10.99^a	62.56^a	86.00^a	42.91^a	2.13^a	6.49^a	29.48^a
V_2	1.66^b	46.06^b	9.55^b	9.13^b	55.47^b	85.56^b	40.73^b	1.93^b	6.19^b	28.73^b
Level of sig.	**	**	**	**	**	**	**	**	**	**
CV (%)	1.59	2.27	1.26	3.21	2.87	0.52	1.16	1.10	0.74	0.91

In a column, figures with same letter or without letter do not differ significantly whereas figures with dissimilar letter differ significantly as per Duncan's New Multiple Range Test (DMRT), ** = Significant at 1% level of probability, V_1 = BARI Cheenabadam-8, V_2 = BINA Cheenabadam-6.

Table 2. Effect of phosphorus on the studied crop characteristics of groundnut

Phosphorus doses (P kg ha^{-1})	leaf area index (LAI)	Dry matter (g plant^{-1})	Primary branches plant^{-1}	Secondary branches plant^{-1}	No. of pegs plant^{-1}	Weight of 100-pods (g)	Weight of 100-seeds (g)	Seed yield (t ha^{-1})	Stover yield (t ha^{-1})	Harvest index (%)
P_1	1.47^d	44.84^d	8.98^d	8.63^d	54.88^c	81.30^d	40.33^d	1.64^d	5.97^d	27.81^d
P_2	1.60^c	46.68^c	9.65^c	9.35^c	56.63^c	82.67^c	41.07^c	1.93^c	6.22^c	28.34^c
P_3	1.89^b	47.88^b	10.02^b	9.93^b	60.65^b	84.69^b	42.57^b	2.18^b	6.40^b	29.86^b
P_4	1.98^a	50.45^a	10.55^a	12.32^a	63.92^a	94.46^a	43.31^a	2.39^a	6.73^a	30.43^a
Level of sig.	**	**	**	**	**	**	**	**	**	**
CV (%)	1.59	2.27	1.26	3.21	2.87	0.52	1.16	1.10	0.74	0.91

In a column, figures with same letter or without letter do not differ significantly whereas figures with dissimilar letter differ significantly as per Duncan's New Multiple Range Test (DMRT),** = Significant at 1% level of probability, P_1= 0 kg P ha^{-1}, P_2=20 kg P ha^{-1}, P_3= 40 kg P ha^{-1} and P_4= 60 kg P ha^{-1}

Table 3. Interaction effect of variety and phosphorus on the studied crop characteristics of groundnut

Interaction (V×P)	Leaf area index (LAI)	Dry matter (g plant^{-1})	Primary branches plant^{-1}	Secondary branches plant^{-1}	No. of pegs plant^{-1}	No. of total pods plant^{-1}	Weight of 100-pods (g)	Weight of 100-seeds (g)	Shelling percentage	Seed yield (t ha^{-1})	Pod yield (t ha^{-1})	Stover yield (t ha^{-1})	Harvest index (%)
V_1×P_1	1.58^{e}	45.56	9.25^{e}	9.75d^{e}	59.75^{b}	38.95^{f}	81.43	41.78^{c}	72.01	1.75^{f}	2.43^{f}	6.07^{e}	28.59^{d}
V_1×P_2	1.68^{d}	47.90	10.00^{c}	10.05^{cd}	61.85^{ab}	42.80^{c}	82.87	42.10^{c}	79.15	2.06^{d}	2.59^{e}	6.39^{c}	28.84^{d}
V_1×P_3	1.97^{b}	50.13	10.25^{b}	10.30^{c}	64.30^{a}	43.65^{b}	85.04	43.27^{b}	80.71	2.26^{b}	2.80^{c}	6.53^{b}	30.01^{bc}
V_1×P_4	2.02^{a}	51.88	10.70^{a}	13.85^{a}	64.35^{a}	44.50^{a}	94.66	44.47^{a}	81.84	2.48^{a}	3.03^{a}	6.92^{a}	30.45^{a}
V_2×P_1	1.37^{g}	44.11	8.70^{f}	7.50^{g}	50.00^{d}	33.60^{g}	81.17	38.88^{e}	70.50	1.53^{g}	2.17^{h}	5.87^{f}	26.96^{f}
V_2×P_2	1.52^{f}	45.46	9.30^{e}	8.65^{f}	51.40^{d}	39.85^{e}	82.46	40.02^{d}	78.11	1.82^{e}	2.33^{g}	6.05^{e}	27.80^{e}
V_2×P_3	1.81^{c}	45.64	9.80^{d}	9.55^{e}	57.00^{c}	40.60^{e}	84.34	41.86^{c}	78.65	2.10^{c}	2.67^{d}	6.28^{d}	29.83^{c}
V_2×P_4	1.93^{b}	49.03	10.40^{b}	10.80^{b}	63.50^{a}	41.91^{d}	94.25	42.16^{c}	80.35	2.29^{b}	2.85^{b}	6.54^{b}	30.38^{ab}
Level of significance	**	NS	*	**	**	**	NS	*	NS	**	**	**	**
CV (%)	1.59	2.27	1.26	3.21	2.87	1.36	0.52	1.16	1.02	1.10	1.26	0.74	0.91

In a column, figures with same letter or without letter do not differ significantly whereas figures with dissimilar letter differ significantly as per Duncan's New Multiple Range Test (DMRT), * = Significant at 5% level of probability, ** = Significant at 1% level of probability. NS = Not significant.

Number of pegs plant^{-1}: Number of pegs plant^{-1} was significantly affected by variety (Table 1). The number of pegs plant^{-1} of BARI Cheenabadam-8 (62.56) was higher than that of BINA Cheenabadam-6 (55.47). The effect of phosphorus on number of pegs plant^{-1} was significant (Table 2). Number of pegs plant^{-1} was the highest (63.92) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg P ha^{-1}, respectively. Interaction effect of variety and phosphorus on number of pegs plant^{-1} was significant (Table 3). The highest number of pegs plant^{-1} (64.35) was recorded from $V_1 \times P_4$ combination and the lowest number of pegs plant^{-1} (50.00) was recorded from $V_2 \times P_1$ combination.

Number of total pods plant^{-1}: Number of total pods plant^{-1} was significantly affected by variety (Figure 1). BARI Cheenabadam-8 produced higher number of total pods plant^{-1} (42.47) than that of BINA Cheenabadam-6 (38.99). This happened due to genetic differences of the varieties.

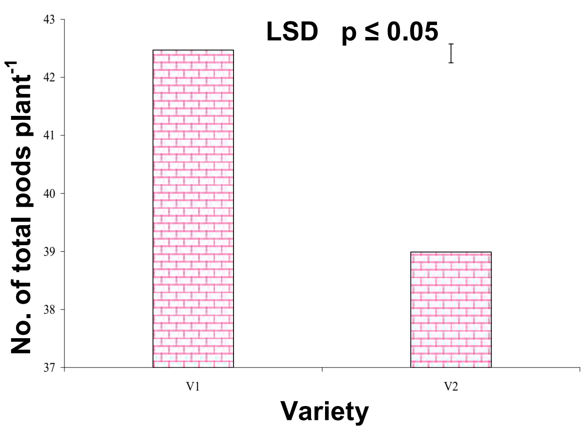

Figure 1. Effect of variety on number of total pods plant^{-1} of groundnut (V_1=BARI Cheenabadam-8 and V_2=BINA Cheenabadam-6)

The effect of phosphorus on number of total pods plant^{-1} was significant (Figure 2). It was noted that number of total pods plant^{-1} increased progressively with the increasing levels of phosphorus. Number of total pods plant^{-1} was the highest (43.21) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg P ha^{-1}, respectively. Similar result was reported elsewhere (Juan *et al.,* 1986). They reported that application of 60 kg P ha^{-1} gave the highest number of pods plant^{-1}. Interaction effect of variety and phosphorus on number of total pods plant^{-1} was significant (Table 3). The highest number of total pods plant^{-1} (44.50) was recorded from $V_1 \times P_4$ combination and the lowest number of total pods plant^{-1} (33.60) was recorded from $V_2 \times P_1$ combination.

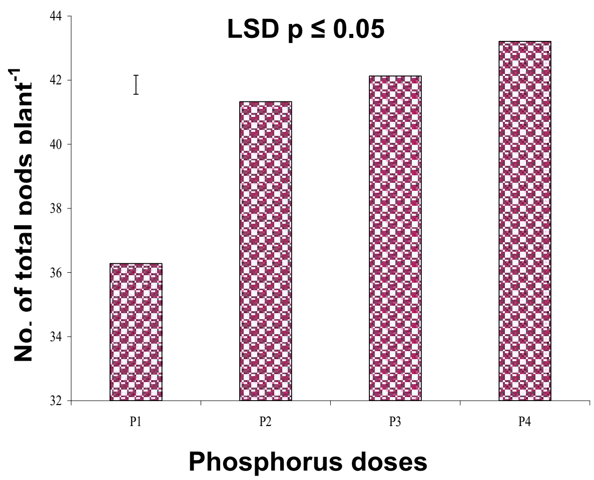

Figure 2. Effect of phosphorus on number of total pods plant^{-1} of groundnut (P_1, P_2, P_3 and P_4= 0, 20, 40 and 60 kg P ha^{-1})

Weight of 100-pods: The effect of variety on weight of 100-pods was significant (Table 1). Weight of 100-pods of BARI Cheenabadam-8 (86.00g) was higher than that of BINA Cheenabadam-6 (85.56 g). The effect of phosphorus on weight of 100-pods was significant (Table 2). Weight of 100-pods was the highest (94.46 g) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg ha^{-1}, respectively. Interaction effect of variety and phosphorus on weight of 100-pods was not significant (Table 3). However, 100-pods weight ranged from 81.17g to 94.66g.

Weight of 100-seeds: The effect of variety on weight of 100-seeds was significant (Table 1). Weight of 100-seeds of BARI Cheenabadam-8 (42.91g) was higher than that of BINA Cheenabadam-6 (40.73g). This happened due to genetic differences of the varieties.

The effect of phosphorus on weight of 100-seeds was significant (Table 2). Weight of 100-seeds was the highest (43.31g) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg P ha^{-1} respectively. This finding is in agreement with El-Habbasha *et al.* (2005). He reported that increasing phosphorus levels increased 100-seeds weight. Interaction effect of variety and phosphorus on weight of 100-seeds was significant (Table 3). The highest 100-seeds weight (44.47g) was recorded from $V_1 \times P_4$ combination and the lowest 100-seeds weight (38.88g) was recorded from $V_2 \times P_1$ combination

Shelling percentage: The effect of variety on shelling percentage was significant (Figure 3). BARI Cheenabadam-8 produced higher shelling percentage (78.59%) than that of BINA Cheenabadam-6 (77.20%). The effect of phosphorus on shelling percentage was significant (Figure 4). Shelling percentage was the highest (81.29%) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg P ha^{-1}, respectively.

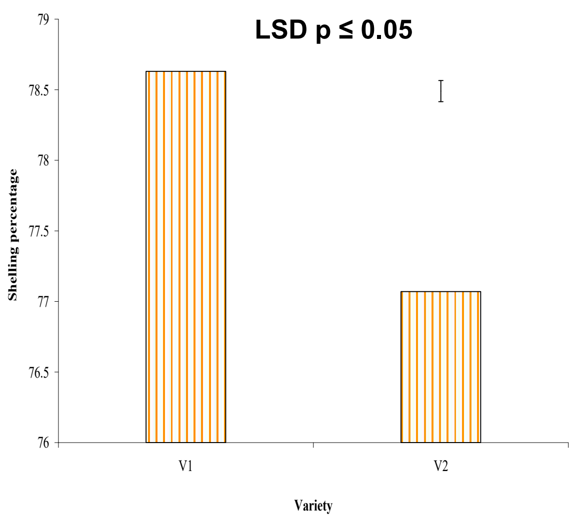

Figure 3. Effect of variety on shelling percentage of groundnut **(**V_1= BARI Cheenabadam-8 and V_2= BINA Cheenabadam-6)

The lowest (71.30%) one was found in 0 kg P ha^{-1}. The improvement of seed yield and pod yield were mainly responsible for the increased shelling percentage in 60 kg P ha^{-1}. This finding is in agreement with Kabir (2010). He reported that the highest shelling percentage (64.22%) was obtained from the application of 50 kg P ha^{-1}. Interaction effect of variety and phosphorus on number of shelling percentage was not significant (Table 3). However, shelling percentage ranged from 70.50% to 81.84% .

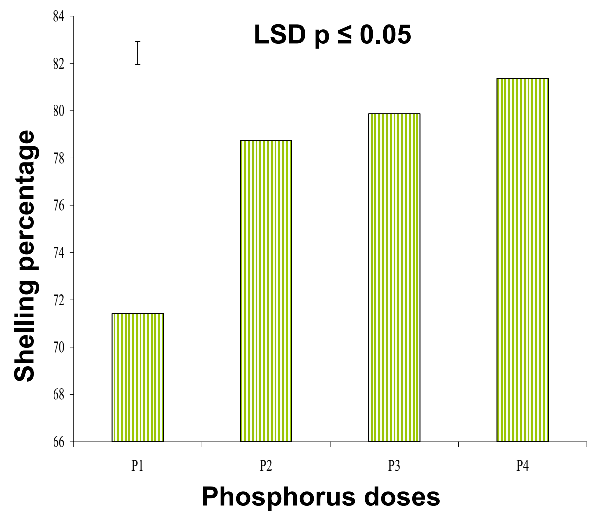

Figure 4. Effect of phosphorus on shelling percentage of groundnut (P_1, P_2, P_3 and P_4= 0, 20, 40 and 60 kg P ha^{-1}**)**

Pod yield: The effect of variety on pod yield was significant (Figure 5). Pod yield of BARI Cheenabadam-8 (2.71t ha^{-1}) was higher than that of BINA Cheenabadam-6 (2.50 t ha^{-1}). The effect of phosphorus on pod yield was significant (Figure 6). Pod yield was the highest (2.94 t ha^{-1}) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg P ha^{-1}, respectively. The lowest (2.30 t ha^{-1}) one was found in 0 kg P ha^{-1}. The improvement of 100-pods weight and 100-seeds weight were mainly responsible for the increased pod yield in 60 kg P ha^{-1}. This finding is in agreement with Juan *et al.* (1986) and Rahman (2013) who reported that yield was increased at the application of 60 kg P ha^{-1}. Interaction effect of variety and phosphorus on pod yield was significant (Table 3). Pod yield was the highest (3.03 t ha^{-1}) in $V_1 \times P_4$ combination and the lowest (2.17 t ha^{-1}) one was found in $V_2 \times P_1$ combination.

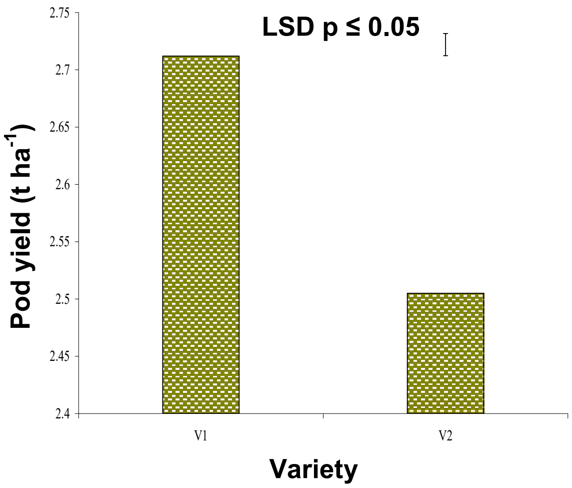

Figure 5. Effect of variety on pod yield of groundnut (V_1=BARI Cheenabadam-8 and V_2=BINA Cheenabadam-8)

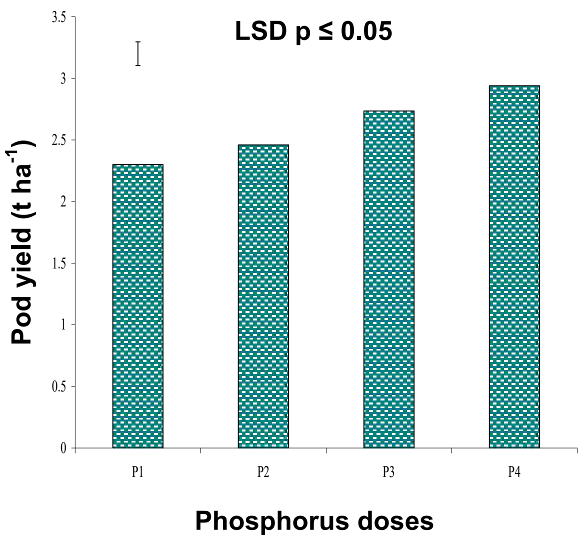

Figure 6. Effect of phosphorus on pod yield of groundnut ($P_{1,}$ $P_{2,}$ P_3 and P_4= 0, 20, 40 and 60 kg P ha^{-1})

Seed yield: The effect of variety on seed yield was significant (Table 1). Seed yield of BARI Cheenabadam-8 (2.13) was higher than that of BINA Cheenabadam-6 (1.93 t ha^{-1}) . The effect of phosphorus on seed yield was significant (Table 2). Seed yield was the highest (2.18 t ha^{-1}) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg P ha^{-1}, respectively. Interaction effect of variety and phosphorus on seed yield was significant (Table 3). Seed yield was the highest (2.48 t ha^{-1}) in $V_1 \times P_4$ combination and the lowest (1.53 t ha^{-1}) one was found in $V_2 \times P_1$ combination.

Stover yield: The effect of variety on stover yield was significant (Table 1). BARI Cheenabadam-8 produced higher stover yield (6.49 t ha^{-1}) than that of BINA Cheenabadam-6 (6.19 t ha^{-1}). The effect of phosphorus on stover yield was significant (Table 2). Stover yield was the highest (6.73t ha^{-1}) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg P ha^{-1}, respectively. The improvement of dry matter was mainly responsible for the increased stover yield in 60 kg P ha^{-1}. This result is similar to the findings of Soloaiman *et al.* (1991). He reported that phosphorus application @ 60 kg P_2O_5 ha^{-1} significantly increased dry weight of plant. Interaction effect of variety and phosphorus on stover yield was significant (Table 3). Stover yield was the highest (6.92 t ha^{-1}) in $V_1 \times P_4$ combination and the lowest (5.87 t ha^{-1}) one was found in $V_2 \times P_1$combination.

Harvest index: The effect of variety on harvest index was significant (Table 1). Harvest index of BARI Cheenabadam-8 (29.48%) was higher than that of BINA Cheenabadam-6 (28.73%). The effect of phosphorus on harvest index was significant (Table 2). Harvest index was the highest (30.43%) in 60 kg P ha^{-1} followed by 40, 20 and 0 kg P ha^{-1}, respectively. The improvement of pod yield and stover yield were mainly responsible for the increased harvest index in 60 kg P ha^{-1}. This result is similar to the findings of Kabir (2010). He reported that the highest harvest index (26.80%) was obtained from the application of 50 kg P ha^{-1}. Interaction effect of variety and phosphorus on harvest index was significant (Table 3). Harvest index (30.45%) was the highest in $V_1 \times P_4$ combination and the lowest (26.96%) one was found in $V_2 \times P_1$ combination.

Conclusion

The highest value of all the parameters like leaf area index , dry matter, number of primary branches plant^{-1}, number of secondary branches plant^{-1} , number of pegs plant^{-1}, number of total pods plant^{-1}, weight of 100-pods , weight of 100-seeds, shelling percentage, pod yield, seed yield, stover yield and harvest index were recorded from BARI Cheenabadam-8 (V_1). Accordingly, The highest value of all the parameters like leaf area index, dry matter, number of primary branches plant^{-1}, number of secondary branches plant^{-1}, number of pegs plant^{-1}, number of total pods plant^{-1}, weight of 100-pods, weight of 100-seeds, shelling percentage, pod yield, seed yield, stover yield and harvest index increased progressively with the increasing level of phosphorus fertilizer i.e. at 60 kg P ha^{-1}. The highest pod yield, seed yield, stover yield, and harvest index were recorded from $V_1 \times P_4$ combination. So it can be concluded that the groundnut crop cv. BARI Cheenabadam-8 should preferably be fertilized with 60 kg P ha^{-1} to obtain the highest yield.

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