Effect of foliar application of micronutrients and urea on mungbean varieties

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(Corresponding Author)

Israt Jahan Sanjida[1]
Md. Mohaiminul Islam Munan[2]
Iqbal Hossain[3]
Abdur Rahman Saimon[4]
Mst. Nusrat Jahan[5]
Syeda Noor e Jannat[6]

[1,3]*Dept. of Agronomy, Patuakhali Science and Technology University, Dumki, Patuakhali, Bangladesh.*
[1]*Email: israt.sanjida04@gmail.com*
[3]*Email: iqbal86@pstu.ac.bd*
[2]*Dept. of Plant Pathology, Patuakhali Science and Technology University, Dumki, Patuakhali, Bangladesh.*
[2]*Email: islammunan41@gmail.com*
[4]*Dept. of Environmental Science, Khulna University, Khulna, Bangladesh.*
[4]*Email: arsaimon27@gmail.com*
[5]*Dept. of Entomology, Patuakhali Science and Technology University, Dumki, Patuakhali, Bangladesh.*
[5]*Email: nusratjahanetee@gmail.com*
[6]*Dept. of Statistics, Jahangirnagar University, Bangladesh.*
[6]*Email: syedanoorejannat@gmail.com*

ABSTRACT

Experiment was carried out to at the Agronomy field of Patuakhali Science and Technology University (PSTU). The treatments comprised of four variety and three fertilizer including control. Varieties were V_1= BINA Mung-8, V_2=BARI mung-2, V_3=BARI mung-5 and V_4=BARI mung-6 and treatments were T_0 = control, T_1 =micro nutrient, T_2= micronutrient and urea. The experiment was laid-out in the Randomized Complete Block Design (RCBD) with three replications. The maximum plant height was found at BARI mung-6 (29.7). Maximum nodule number was found at BARI mung-6 variety (5.90). The number of effective nodule was highest at BARI mung-6 variety (2.36). In case of no of seed per pod and 1000-seed weight, BARI mung-6 variety gave highest value and those were 11.25 and 70.5 g respectively. Maximum plant height, nodule number, number of effective nodule and number of pod per plant were found at T_2 treatment. The pod length, seed per pod and 1000-seed; T_2 treatment gave the highest value and those were 5.5 cm, 11.25 and 65.64 g respectively. In case of plant height, chlorophyll content, number of nodule, number of effective nodule, pod per plant, pod length, pod weight/m^2, seed per pod and 1000-seed weight, combined effecr of BARI mung-6 x micronutrient and urea (T_2) gave highest value and those were (29.95, 47.5, 6.17, 2.40, 6.20, 6.20, 76.75, 11.20) cm and 68.45 g respectively. This result revealed that mungbean variety BARI mung-6 and T_2 treatment performed best in combination (V_4T_2).

Keywords: *Foliar application, Micronutrients, Mungbean, Pod, Pulse crop, Urea, Variety.*

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Highlights of this paper:

- BARI mung-6 produced greater results on the all characters of growth and yield except chlorophyll content.
- Among the three treatments, T_2 (Micronutrient and Urea) gave the higher results.
- Mungbean variety BARI-6 and T_2 treatment performed best in combination (V_4T_2).

1. INTRODUCTION

Pulses have occupied immense significance in recent years as an important component of Bangladeshi economy. Mungbean (*Vigna radiata* L.) is one of the most important pulse crops of Bangladesh. Pulses are seeds of leguminous plants and belong to the family Fabaceae. Mungbean is becoming important crop, as it is the best alternatives to meet the food needs of the large population of developing countries due to its nutritional superiority and nitrogen fixing character [1]. Among the pulse crops, mungbean has special importance in intensive crop production of the country because of its short growing period. However, with the development of early maturing varieties, it has also proved to be an ideal crop for summer season [2].

It also serves as an excellent cover crop to protect the soil against erosion and suppresses the weeds effectively. There are many reasons for having a lower yield of mungbean. The management of fertilizer is an important one that greatly affects the growth, development and yield of this crop. Pulses although fix nitrogen from the atmosphere, there is evidences that application of nitrogenous fertilizers becomes helpful in increasing the yield. To produce one unit of seeds, mungbean needs as much as three times more nitrogen than that needed by cereals like rice. Mungbean requires a large amount of nutrients in 2-3 phases in their life span [3]. Application of primary nutrient elements along with required micronutrient in a balanced dosage is likely to be effective for getting higher grain yield of mungbean in red and lateritic soil in which most of the nutrient elements are deficient [4]. In the present study, an attempt has been made to study the effect of foliar applied micronutrients on the nutrient accumulation in mungbean.

2. MATERIALS AND METHODS

The experiment was carried out at the Agronomy Research farm, Patuakhali Science and Technology University, Dumki, Patuakhali. Geographically, the research farm is located at $22^{0}37^{/}$ N latitude and $89^{0}10^{/}$ E longitudes.

The area is under the Gangetic Tidal Floodplains and falls under Agroecological zone "AEZ-13". This place enjoys the sub-tropical monsoon climate which is characterized by heavy rainfall during the month of April to September Plenty of sunshine and moderately low temperature prevails during rabi season from October to March which are suitable for growing of mungbean in Patuakhali.

The treatments comprised of four variety and three fertilizer levels including control. The experiment was laid out with three replications. Two factor were used, Factor A: Variety; V_1: BINA mung-8, V_2: BARI mung -2, V_3: BARI mung-5, V_4: BARI mung-6 and Factor B: Fertilizer T_0: Control, T_1: Micro nutrient (B, Mo, Zn, Cu, Fe and Mn), T_2: Micro nutrient (B, Mo, Zn, Cu, Fe and Mn) and urea.

2.1. Experimental Layout And Design

The experiment was set up in a Randomized Complete Block Design (RCBD) With 3 replications.The land was divided into three blocks. Each block was divided into 12 plots. So, there was 36 plots in the experimental field. The size of individual plots was 6 m^2 (3mx2m). The space between blocks and plots is 0.30 m.

2.2. Collection of Plant Material

BINA mung- 8, BARI mung- 2, BARI 5 and BARI 6 those variety were collected from market of patuakhali district.

2.3. Field Preparation and Cultural Schedule

To obtain fine tilth and good crop growth, the field was prepared by cross ploughing with tractor drawn cultivator followed by harrowing and planking. The weeds and crop residues were removed to get weed and stubble free seed bed. The following operations were done during the course of study.

2.4. Fertilizer Application

Fertilizers were used during final land preparation. Following fertilizers were applied in the field. (According to fertilizer recommendation guide, BARC 1914).

1. Urea, Zupsum, TSP (Triple Super Phosphate), MoP were applied @ 60kg/ha., 100kg/ha, 80kg/ha and 30kg/ha and was applied.
2. 12 plots among 36 plot were treated as controlled. Another 12 plots were applied micronutrients (B, Mo, Zn, Cu, Fe and Mn respectively in the form of H_3BO_3, Na_2MoO_4, $ZnSO_4$, $CuSO_4$, $FeSO_4$, $MnSO_4$) at the rate of 16.90 kg/ha, 4.29kg/ha, 15.69kg/ha , 7.78kg /ha,9.95kg/ha, 6.14kg/ha.
3. In the rest of 12 plots, 34 gm urea plus micronutrients were applied at the rate mentioned before.

Weeding, mulching and thinning were done regularly when necessary. Data were recorded on the following factors -

2.5. Plant Height (cm)

Plant height was measured at regular interval of 20 days commencing from 20 days after sowing till harvest. The height of five randomly selected and tagged plants in second row of each plot was measured from ground surface to apex leaf and then average was taken.

2.6. Chlorophyll Content of Leaf

Data were collected from the five selected plant in each plot. Two upper leaves and two lower leaves were taken in each selected plant to measure the chorophyll content of the leaf through SPAD meter. Then average value was calculated.

2.7. Number of Nodule at Maximum Flowering Stages

At flowering stages, data were collected from the five selected plant in each plot and average value was calculated.

2.8. Days of Flowering

Days of flowering were recorded by visual observation from five tagged plant per plot.

2.9. Number of Nodule Per Plant

Number of nodule per plants was taken for from five different plant per plot.

2.10. Length of Pod (Cm)

Length of pod in cm of sampled plants was recorded from base of pod to the tip with the help of meter scale and then average was taken.

2.11. Number of Pods/Plant

Number of pods in sampled five plants were counted. The average number were computed and expressed as number of pods per plant.

2.12. Number of Seeds/ Pod

The number of grains in pods of observational plants were counted. The average number were computed and expressed as number of grains per pod.

2.13. 1000- Seed Weight (G)

A representative sample of 1000 grains of mungbean was sundried at 15 % moisture level from each plot and weighed in gram.

2.14. Grain Yield (Q/Ha)

Weight of grains obtained after threshing, cleaning and sun drying was taken and finally recorded in quintal per hectare.

3. STATISTICAL ANALYSIS

The recorded data on various parameters under study were statistically analyzed according to the principles of experimental design to find out the variation resulting from experimental treatments. The means for all the treatments were calculated and analysis of variance for each parameter was performed by F-test. Comparison of treatment means was done by Least Significance Difference (LSD) at 5% level of probability.

4. RESULTS AND DISCUSSION

4.1. Plant Height (Cm)

4.1.1. Effect of Variety on Plant Height

Plant height did not show variation due to different variety. Maximum plant height was found at BARI mung-6 which was 29.6 cm, followed by BARI mung-5 which was 29.2 cm. Minimum plant height was found at BINA mung-8 variety (Figure 1).

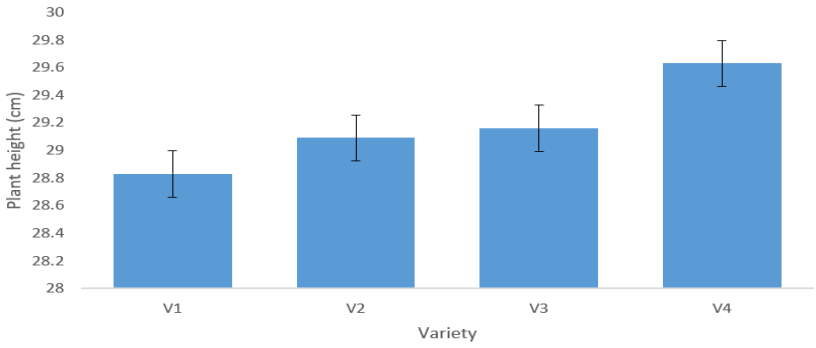

Figure 1. Varietal effect on plant height.

Note: V_1 = BINA mung-8, V_2= BARI mung-2, V_3=BARI mung-5, and V4 = BARI mung-6.

4.1.2. Effect of Treatment on Plant Height

Plant height showed variation due to different treatment. Maximum plant height was found at T_2 which was 29.4 cm followed by T_1. Minimum plant height was found at control (Figure 2). That means treatments performed better than control. This findings is similar to other researchers. Ardeshna, et al. [5] concluded that application of N along with micronutrient produced significantly greater plant height. Similar result was also obtained by Shrivastava and Verma [6].

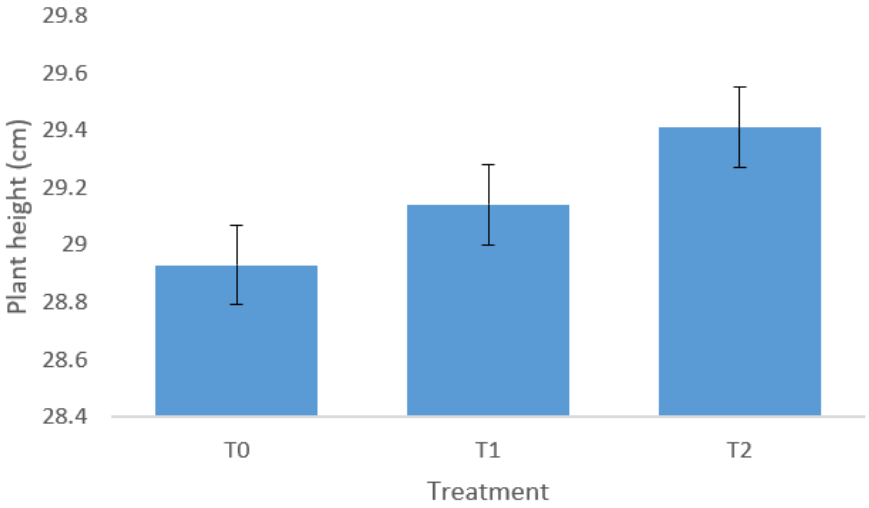

Figure 2. Effect of treatment on plant height.

Note: T_0 = Control, T_1= Micronutrient, T_2 =Micronutrient with urea, LSD= 0.08.

4.1.3. Interaction Effect of Variety and Fertilizer Treatment on Plant Height

Plant height varied from 28.66 to 29.95. Maximum plant height was observed at V_4 x T_2 treatment combination followed by V_4 x T_1 and V_3 x T_2 treatment combination. Minimum plant height was observed at V_1 x T_0 treatment combination followed by another control V_2 x T_0 treatment combination (Figure 3).

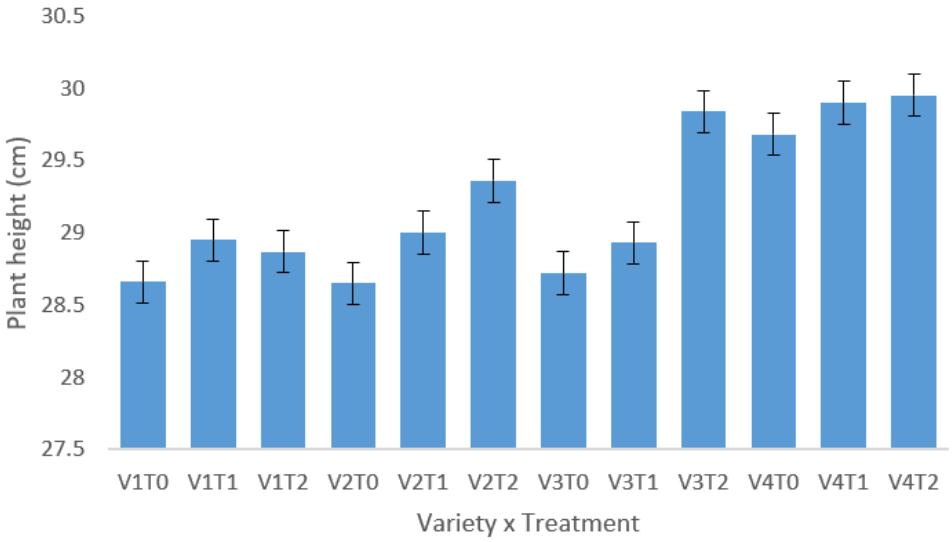

Figure 3. Combined effect of variety and treatment on plant height.

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6, T_0 = control, T_1= micronutrient, T_2 =Micronutrient with urea.

4.2. Chlorophyll Content (µmol/M²)

4.2.1 Effect of Variety on Chlorophyll Content (µmol/M²)

Chlorophyll content did not show variation due to different variety. Maximum Chlorophyll content was found at BARI mung-5 which variety followed by BARI mung-6. Minimum Chlorophyll content was found at BINA mung-8 variety (Figure 4).

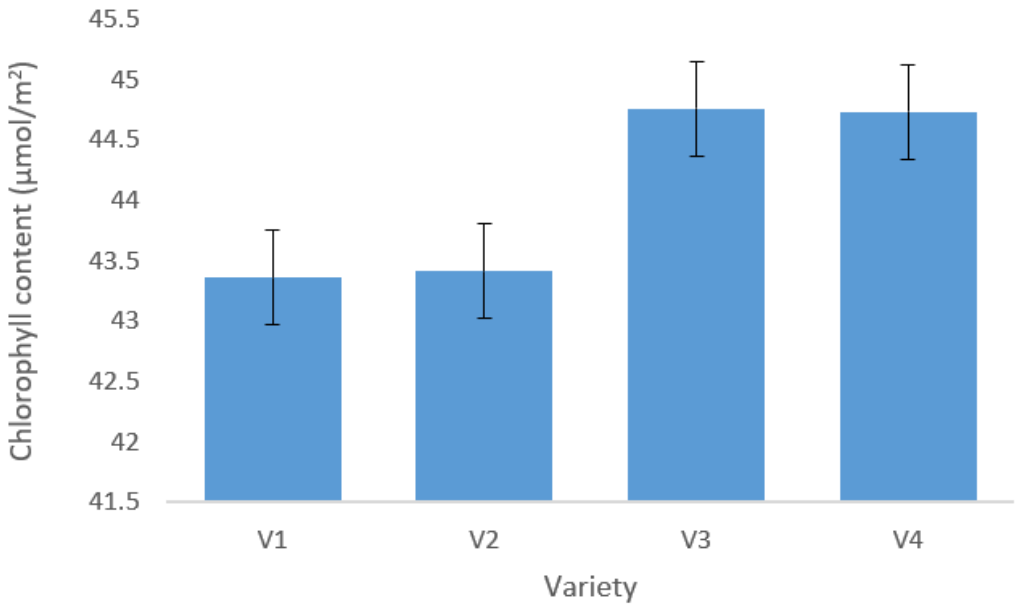

Figure 4. Varietal effect on chlorophyll content.

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6.

4.2.2. Effect of Treatment on Chlorophyll Content (µmol/M²)

Maximum Chlorophyll content was found at T_1 followed by T_2. Minimum was found at control (Figure 5). That means, all the treatments performed better than control. Bairwa, et al. [7] in his study, made similar report on chlorophyll content.

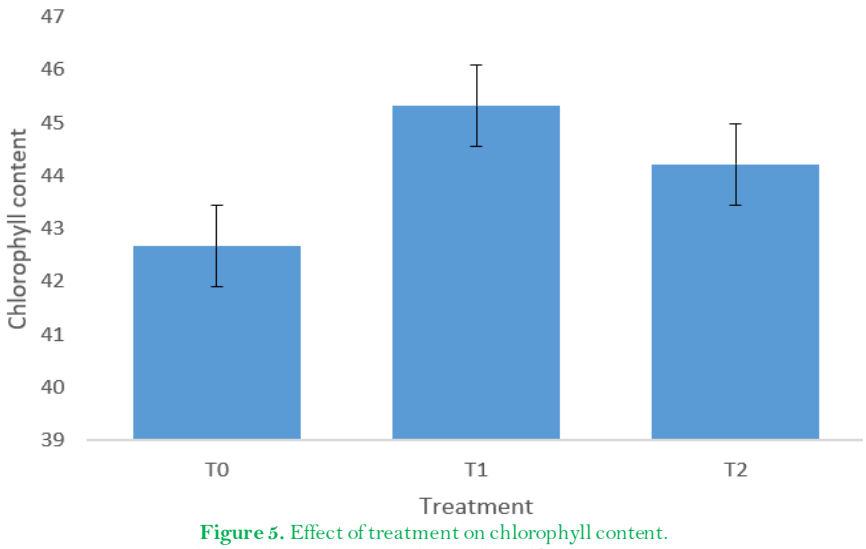

Figure 5. Effect of treatment on chlorophyll content.

Note: T_0 = Control, T_1= Micronutrient, T_2 =Micronutrient with urea, $LSD_{(5\%)} = 2.45$.

4.2.3. Interaction Effect of Variety and Treatment on Chlorophyll Content (µmol/M²)

Interaction effect of variety and treatment on chlorophyll content showed variation. chlorophyll content varied from 41.7 to 47.4 µmol/m². Maximum chlorophyll content was observed at V_4 x T_2 treatment combination followed by V_4 x T_1 and V_3 x T_2 treatment combination. Minimum chlorophyll content was observed at V_1 x T_0 treatment combination (Figure 6).

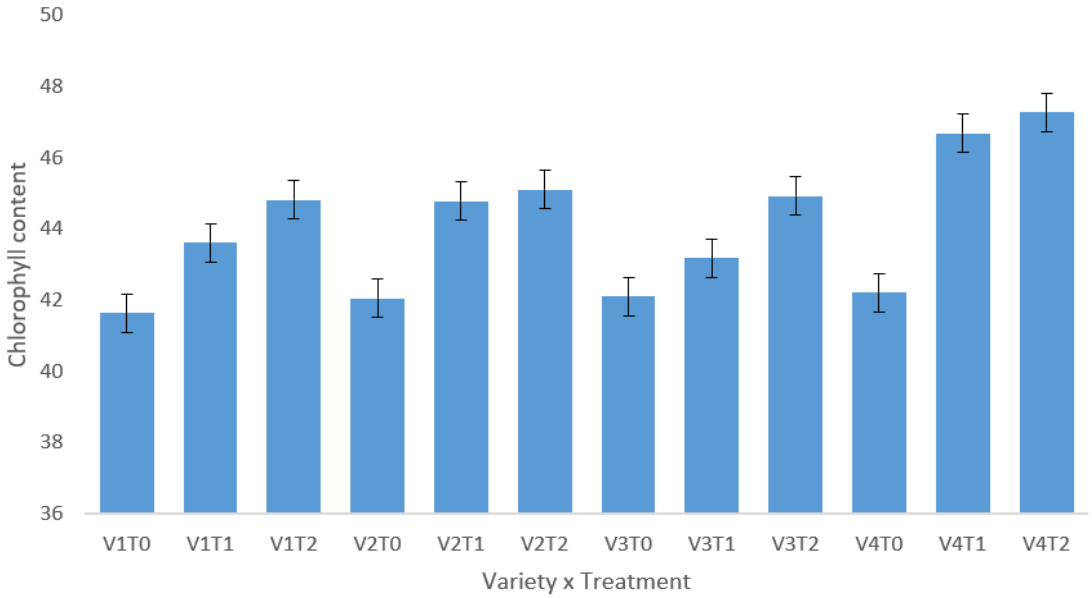

Figure 6. Combined effect of Variety and treatment -on chlorophyll content.

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6, T_0 = Control, T_1= Micronutrient, T_2 =Micronutrient with urea, LSD = 8.20.

4.3. Number of Nodule

4.3.1. Effect of Variety on Nodule Number

Number of nodule varied from 5.40 to 5.90 due to different variety used in this experiment. Nodule number did not show variation due to different variety. Maximum nodule number was found at BARI mung-6 variety followed by BARI mung-5. Minimum number of nodule per plant was found at BINA mung-8 variety (Figure 7).

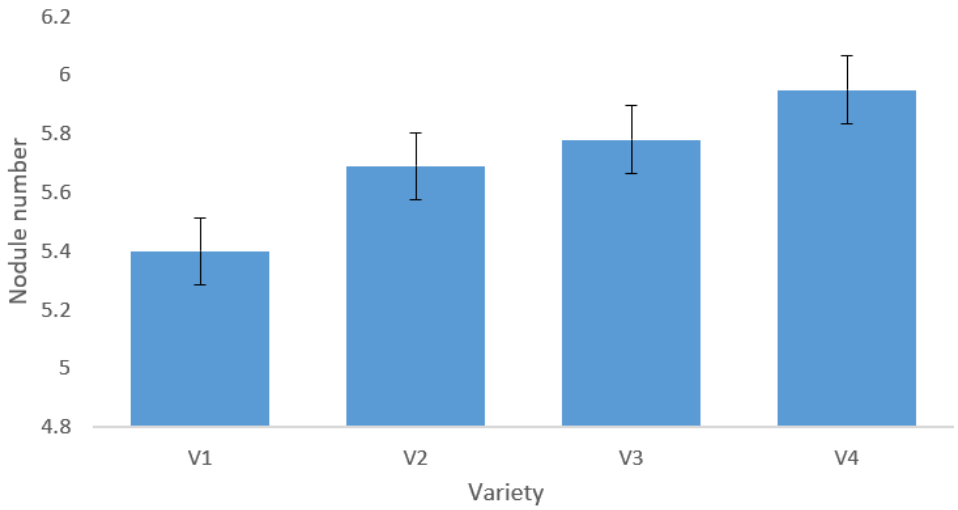

Figure 7. Varietal effect on nodule number per plant.

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6.

4.3.2. Effect of Treatment on Nodule Number

Maximum Nodule number per plant was found at T_1 followed by T_2. Minimum Nodule number per plant was found at control (Figure 8). That means treatments performed better than control. Das, et al. [8] reported that application of micronutrient increases the nodule number in mungbean.

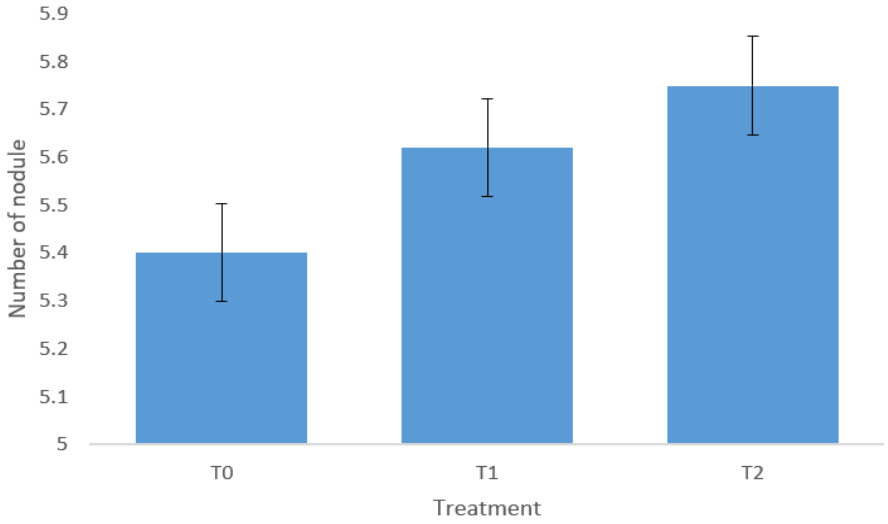

Figure 8. Effect of treatment on nodule number per plant.

Note: T_0 = Control, T_1= Micronutrient, T_2 =Micronutrient with urea.

4.3.3. Interaction Effect of Variety and Fertilizer Treatment on Number of Nodule Per Plant

Maximum number of nodule per plant was observed at V_4T_2 treatment combination followed by V_4T_1 and V_3T_2 treatment combination. Minimum number of nodule per plant was observed at V_1T_0 treatment combination followed by another control V_2T_0 treatment combination (Figure 9).

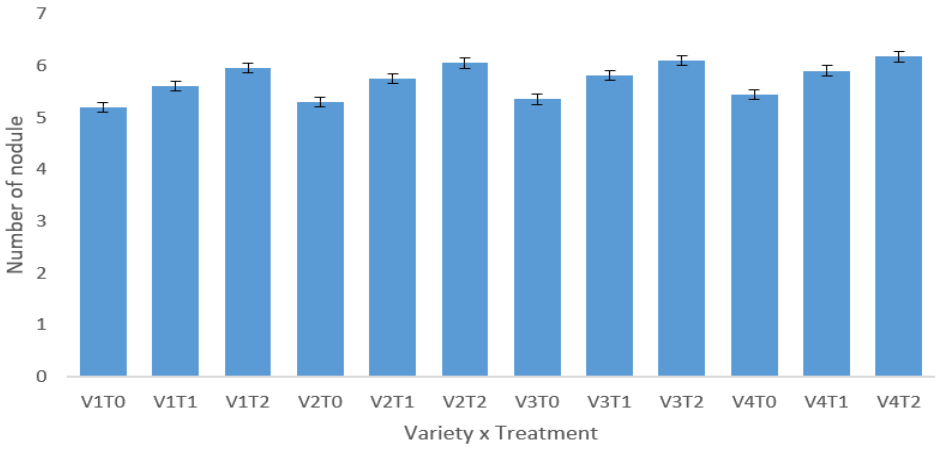

Figure 9. Combined effect of variety and treatment on number of nodule.

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6, T_0 = control, T_1= Micronutrient, T_2 =Micronutrient with urea.

4.4. Number of Effective Nodule

4.4.1. Effect of Variety on Number of Effective Nodule

No. of effective nodule varied from 2.00 to 2.36 due to different variety used in this experiment. Maximum number of effective nodule was found at BARI mung-6 variety. Minimum number of nodule per plant was found at BINA mung -8 variety (Figure 10).

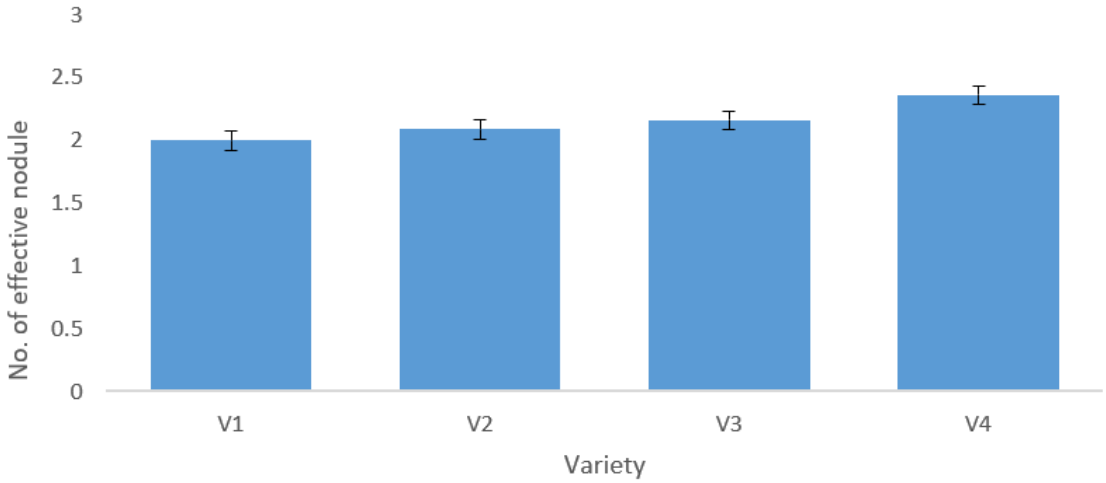

Figure 10. Varietal effect on number of effective nodule.

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6.

4.4.2. Effect of Treatment on Effective Nodule Number

Maximum effective nodule number per plant was found at T_2 followed by T_1. Minimum effective nodule number per plant was found at control (Figure 11). Treatments performed better than control. Shukla and Dixit [9] studied in a field experiment with mungbean and reported that application of micronutrient and urea increased the effective nodulation owing to better root growth.

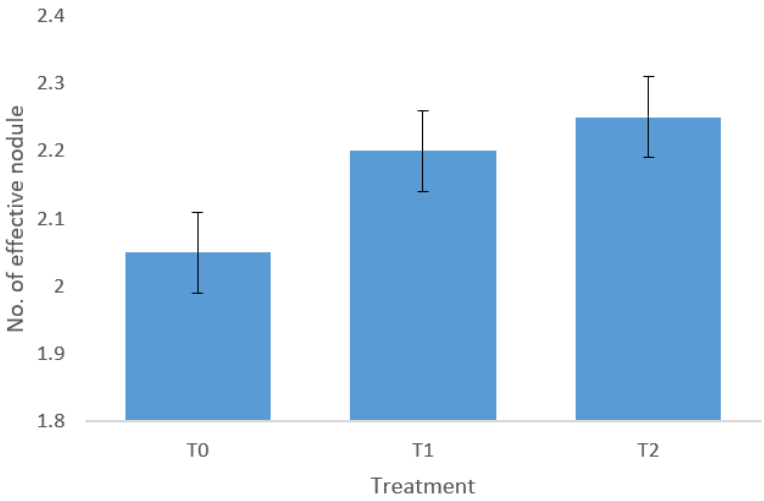

Figure 11. Effect of treatments on number of effective nodule.

Note: T_0 = Control, T_1= Micronutrient, T_2 =Micronutrient with urea.

4.4.3. Interaction Effect of Variety and Fertilizer Treatment on Number of Effective Nodule Per Plant

Interaction effect of variety and treatment on number of effective nodule per plant did not show variation. Number of effective nodule per plant varied from 1.80 to 2.40. Maximum number of nodule per plant was observed at V_4 x T_2 treatment combination followed by V_4 x T_1 and V_3 x T_2 treatment combination. Minimum number of effective nodule per plant was observed at V_1 x T_0 treatment combination followed by another control V_2 x T_0 treatment combination (Figure 12).

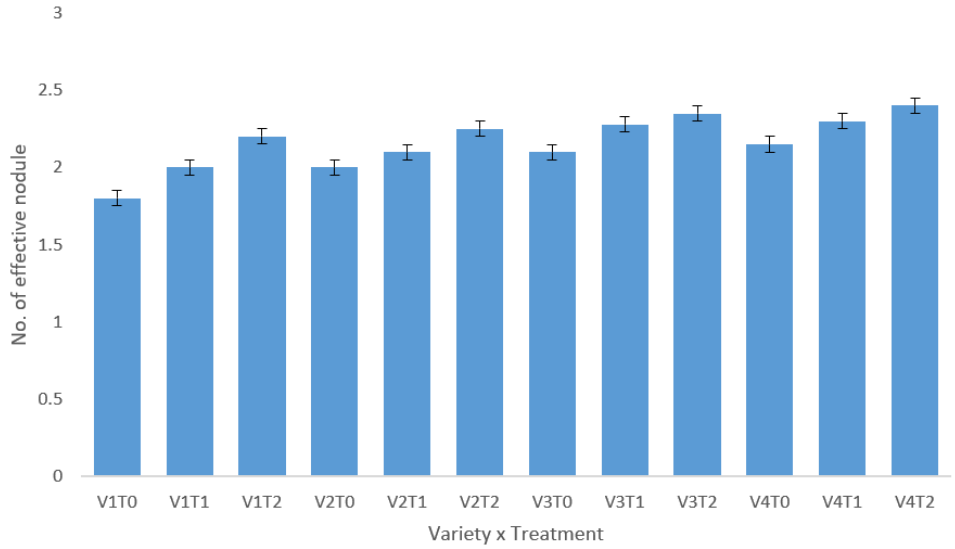

Figure 12. Combined effect of variety and treatment on effective nodule number.

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6, T_0 = control, T_1= Micronutrient, T_2 =Micronutrient with urea.

4.5. Number of Pods Per Plant

4.5.1. Effect of Variety on Number Pods Per Plant

Number of pods per plant varies from 5.05 to 5.48 due to different variety used in this experiment. Maximum number of pods per plant was found at BARI mung-6 variety followed by BARI mung-5. Minimum number of nodule per plant was found at BINA mung-8 variety (Figure 13). Rahman, et al. [10] made similar agreement in his study.

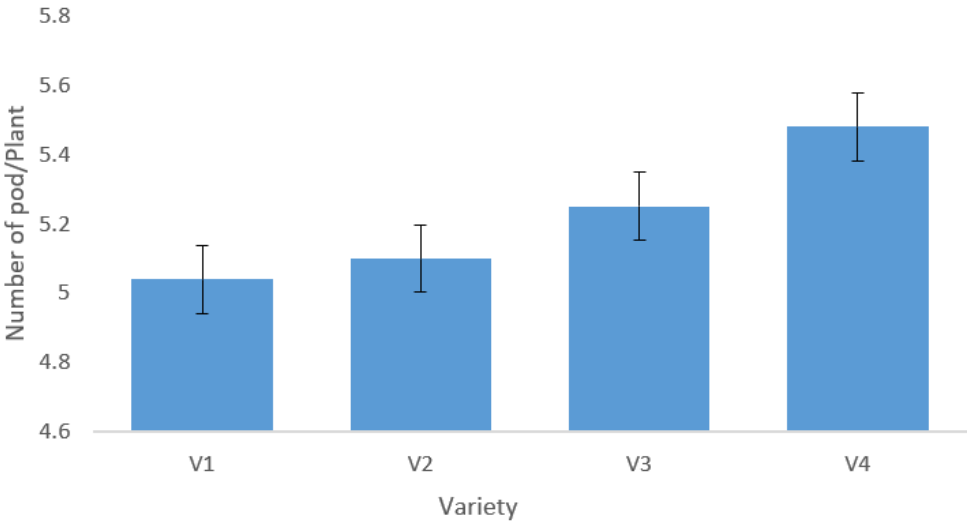

Figure 13. Varietal effect on number of pods per plant.

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6.

4.5.2. Effect of Treatment on Number Pods Per Plant

Maximum number of pods per plant was found at T_2 followed by T_1. Minimum number of pod per plant was found at control (Figure 14). That means treatments performed better than control. Asaduzzaman, et al. [11] studied the effect of micronutrients (Zn, Mo, Fe) on fertilization and productivity potential of mungbean gave the highest dry pods per plant, seeds per pod, 1000 seed weight, seed yield per plant.

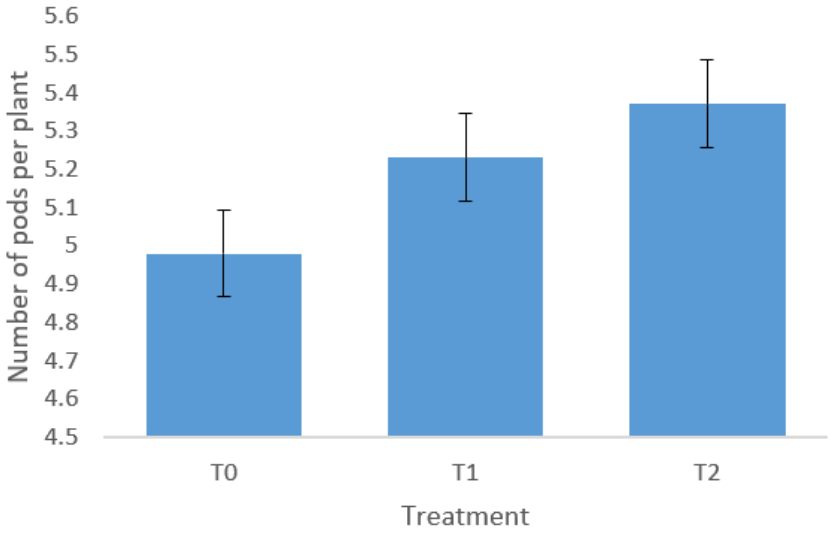

Figure 14. Effect of treatment on number of pods per plant.

Note: T_0 = Control, T_1= Micronutrient, T_2 =Micronutrient with urea.

4.5.3. Interaction Effect of Variety and Fertilizer Treatment on Number of Pods Per Plant

Interaction effect of variety and treatment on number of pods per plant did not variation. Number of pods per plant varied from 4.4 to 6.20. Maximum number of pods per plant was observed at V_4 x T_2 treatment combination followed by V_4 x T_1 and V_3 x T_2 treatment combination. Minimum number of pods per plant was observed at V_1 x T_0 treatment combination followed by another control V_2 x T_0 treatment combination (Table 1).

Table 1. Combined effect of variety and treatment on pod per plant.

Sl no	Variety	Treatments	Number of pod per plant
		T_0	4.40
1	V_1	T_1	5.06
		T_2	5.26
		T_0	4.76
2	V_2	T_1	5.35
		T_2	5.54
		T_0	4.86
3	V_3	T_1	5.87
		T_2	6.05
		T_0	5.02
4	V_4	T_1	5.94
		T_2	6.20
CV%			14.06

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6, T_0 = Control, T_1= Micronutrient, T_2 =Micronutrient with urea
CV = Coefficient of variation

4.6. Pod Length (Cm)

4.6.1. Effect of Variety on Pod Length

Pods length did not show significant due to different variety used in this experiment. Pods length varies from 5.11 to 5.0 due to different variety used in this experiment. Maximum pod length was found at BARI mung-6 variety and minimum was found at BINA mung-8 variety (Figure 15).

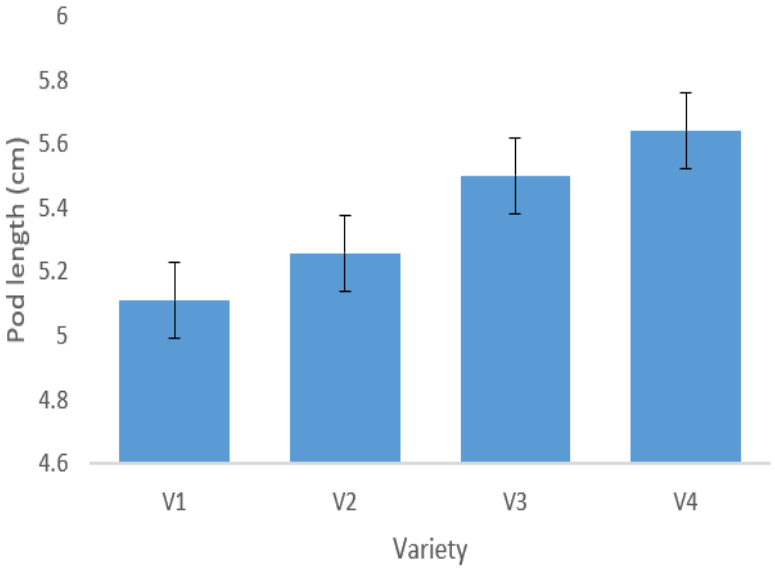

Figure 15. Varietal effect on pod length(cm).

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6.

4.6.2. Effect of Treatment on Pod Length (Cm)

Pods length varies from 5.25 to 5.5 cm due to different treatment used in this experiment Maximum number of pods per plant was found at T_2 followed by T_1. Minimum effective nodule number per plant was found at control (Figure 16).

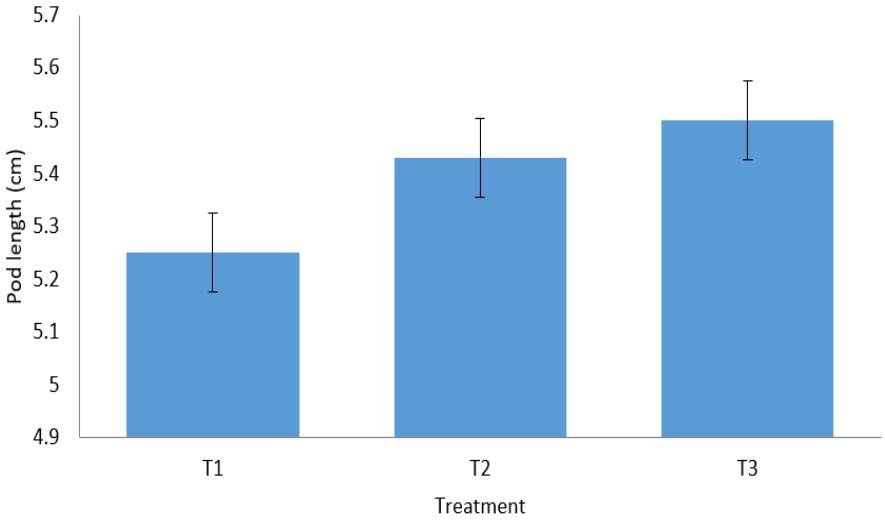

Figure 16. Treatment effect on pod length (cm).

Note: T_0 = Control, T_1= Micronutrient, T_2 =Micronutrient with urea.

4.6.3. Interaction Effect of Variety and Fertilizer Treatment on Pod Length

Pod length varied from 4.78 to 6.20. Maximum number of pods per plant was observed at V_4 x T_2 treatment combination followed by V_4 x T_1 and V_3 x T_2 treatment combination. Minimum number of pods per plant was observed at V_1 x T_0 treatment combination followed by another control V_2 x T_0 treatment combination (Table 2).

Table 2. Combined effect of variety and treatment on pod length.

Sl no	Variety	Treatments	Pod length (cm)
		T_0	4.78
1	V_1	T_1	5.05
		T_2	5.25
		T_0	4.90
2	V_2	T_1	5.35
		T_2	5.54
		T_0	4.96
3	V_3	T_1	5.55
		T_2	6.05
		T_0	5.02
4	V_4	T_1	5.87
		T_2	6.20
CV%			12.37

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6, T_0 = Control, T_1= Micronutrient, T_2 =Micronutrient with urea CV = Coefficient of variation.

4.7. Number of Seed Per Pod

4.7.1. Effect of Variety on Number of Seed Per Pod

Number of pod varied due to different variety used in this experiment. Number of pod varied from 10.12 to 11.25 due to different variety used in this experiment. Maximum

number of seed per pod was found at BARI mung-6 variety and minimum was found at BINA mung-8 variety (Figure 17).

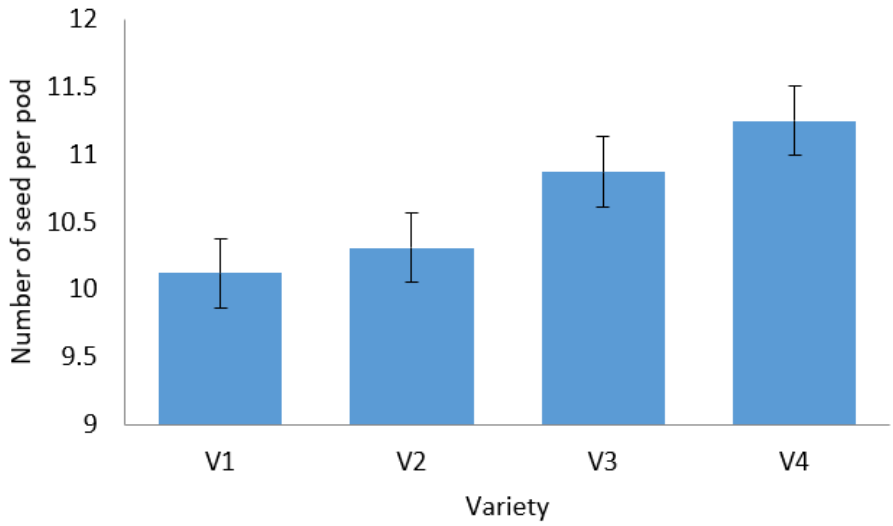

Figure 17. Varietal effect on number of seed per pod.

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6.

4.7.2. Effect of Treatment on Number of Seed Per Pod

Pods length varies from 9.95 to 11.25 due to different treatment used in this experiment Maximum number of pods per plant was found at T_2 followed by T_1. Minimum effective nodule number per plant was found at control (Figure 18). That means treatments performed better than control.

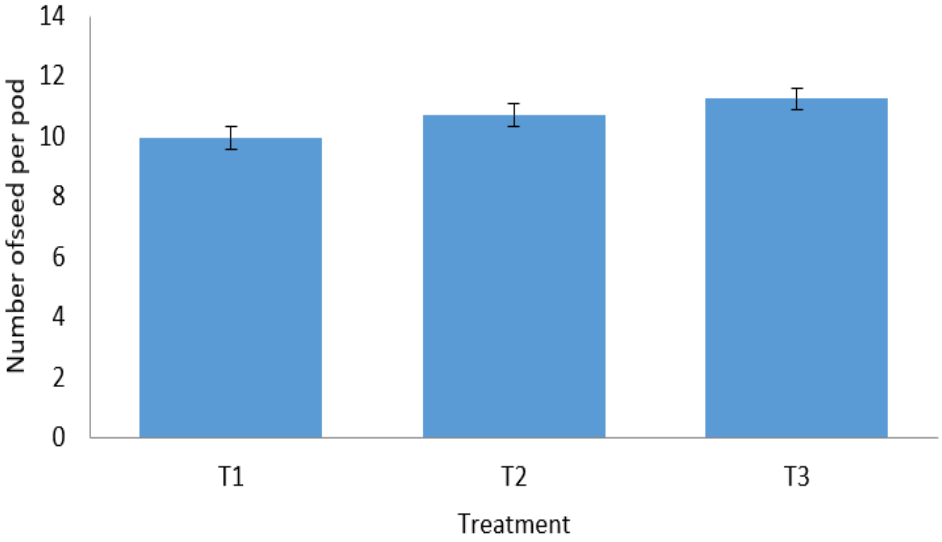

Figure 18. Effect of treatments on number of seed per pod.

Note: T_0 = Control, T_1= Micronutrient, T_2 =Micronutrient with urea.

4.7.3. Interaction Effect of Variety and Fertilizer Treatment on Number of Seed Per Pod

Interaction effect of variety and treatment on number of seed per pod showed variation. number of seed per pod varies from 8.82 to 12.20. Maximum number of seed per pod was observed at V_4 x T_2 treatment combination followed by V_4 x T_1 and V_3 x T_2 treatment combination. Minimum number of seed per pod was observed at V_1 x T_0 treatment combination followed by another control V_2 x T_0 treatment combination (Table 3).

4.8. 1000-Seed Weight (G)

4.8.1. Effect of Variety on 1000-Seed Weight

1000-seed weight varied from 54.25 to 70.5 due to different variety. Maximum data on 1000-seed weight was found at BARI mung-6 variety and minimum was found at BARI-8 (Figure 19).

Table 3. Combined effect of variety and treatment on number of seed per pod.

Sl no	Variety	Treatments	Number of seed per pod
		T_0	8.82
1	V_1	T_1	9.75
		T_2	10.94
		T_0	9.05
2	V_2	T_1	9.95
		T_2	11.14
		T_0	9.15
3	V_3	T_1	10.45
		T_2	11.50
		T_0	9.20
4	V_4	T_1	11.02
		T_2	12.2
CV%			15.23

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6, T_0 = Control, T_1= Micronutrient, T_2 =Micronutrient with urea
CV = Coefficient of variation.

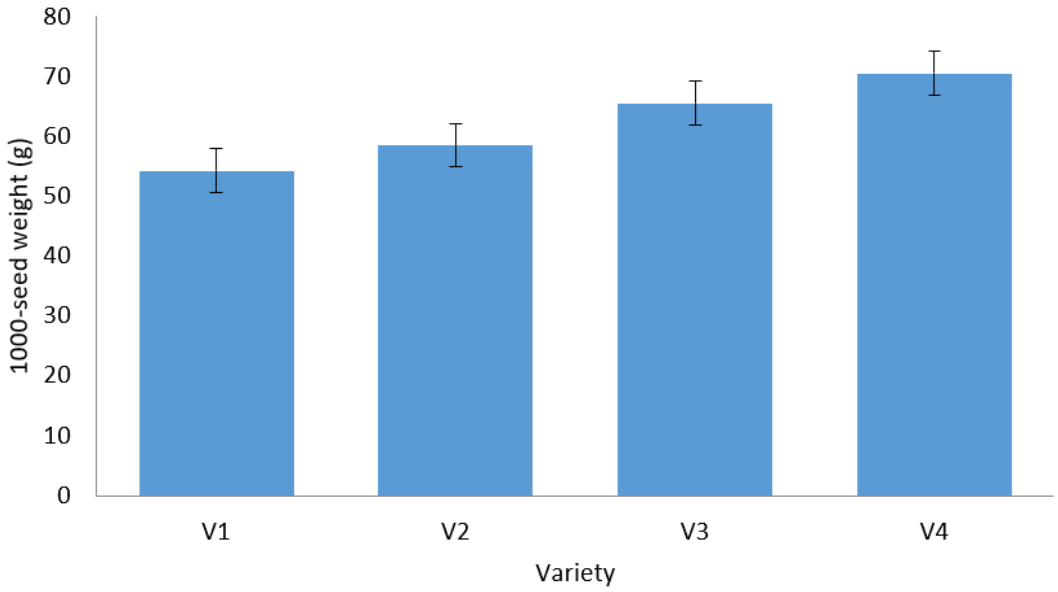

Figure 19. Effect of variety on 1000-seed weight.

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6.

4.8.2. Effect of Treatment on 1000-Seed Weight

1000-seed weight varied from 35.5 to 65.64 due to different variety. Maximum data on 1000-seed weight was found at T2 treatment and minimum was found at Control (Figure 20).

4.8.3. Interaction Effect of Variety and Fertilizer Treatment on 1000-Seed Weight

Interaction effect of variety and treatment on 1000-seed weight showed variation. Maximum 1000-seed weight was observed at V_4T_2 treatment combination followed by V_4T_1 and V_3T_2 treatment combination. Minimum 1000-seed weight was observed at V_1T_0 treatment combination (Table 4).

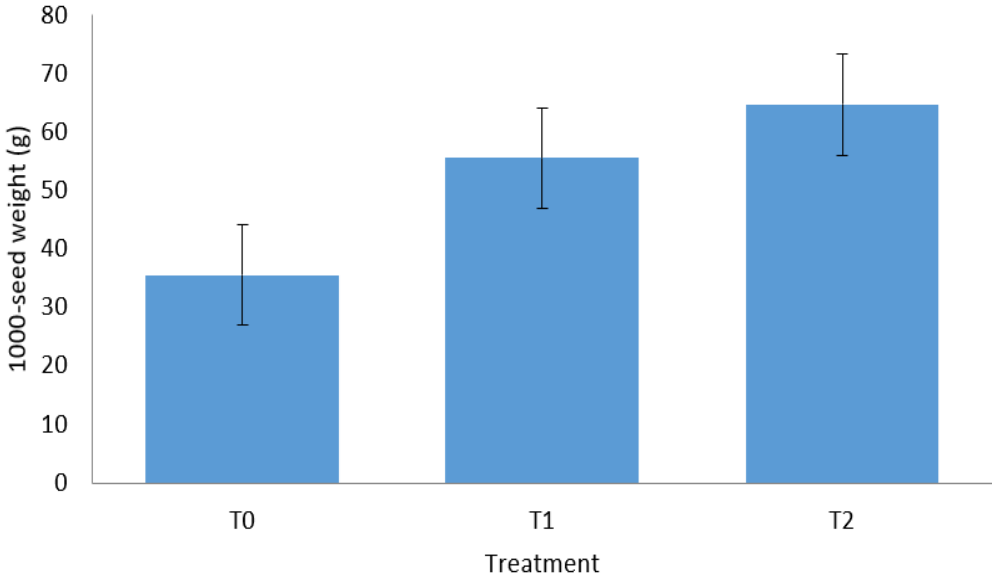

Figure 20. Effect of treatment on 1000-seed weight.

Note: T_0 = Control, T_1= Micronutrient, T_2 =Micronutrient with urea.

Table 4. Combined effect of variety and treatment on 1000-grain weight.

Sl no.	Variety	Treatments	1000-seed weight (g)
		T_0	35.45
1	V_1	T_1	54.54
		T_2	59.65
		T_0	38.2
2	V_2	T_1	56.25
		T_2	62.4
		T_0	40.23
3	V_3	T_1	57.4
		T_2	64.3
		T_0	41.2
4	V_4	T_1	59.45
		T_2	68.45
Cv%			27.31

Note: V_1 = BINA mung-8, V_2 = BARI mung-2, V_3 = BARI mung-5, V_4= BARI mung-6, T_0 = Control, T_1=Micronutrient, T_2 =Micronutrient with urea. CV = Coefficient of variation.

5. SUMMERY AND CONCLUSION

BARI mung-6 produced greater results on the all characters of growth and yield except chlorophyll content. Among the four varieties of mungbean, BARI mung-6 gave best results on growth characters *Viz.*, plant height, chlorophyll content, nodule number, number of effective nodule. Other yield related parameters *Viz.*, pod number, pod length, seed per pods, and 1000-seed weight.

T_2 treatment produced greater results on the all characters of growth and yield. Among the three treatments of T_2 gave the higher results on parameters *Viz.*, plant height, chlorophyll content, nodule number, number of effective nodule, pod number, pod length, seed per pods and 1000-seed weight.

Incase of combined effect, BARI mung-6 and T_2 treatment performed best in all most all cases in all parameters. Incase of plant height, chlorophyll content, number of nodule, number of effective nodule, pod per plant, pod length, seed per pod and 1000-seed highest value were 29.95, 47.5, 6.17, 2.40, 6.20, 6.20, 11.20 and 68.45 g respectively.

This result revealed that mungbean variety BARI-6 and T_2 treatment performed best in combination (V_4T_2) followed by combination of BARI-5 and T_1 treatment (V_3T_1). Considering the above observation of the present experiment, further studies are needed to confirm this result regarding mungbean varieties and different micronutrient in different agro-ecological zones of Bangladesh before final recommendation.

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