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Effect of Spacing with different sowing method on Growth and Yield performance of Green gram

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ABSTRACT

Mung bean is an excellent source of easily digestible high quality protein .It contains24% protein, 0.00039% iron and energy 334 cal/100g of mung beans.Knowing the right spacing would be of paramount importance to low income farmers who depend on the crop.The experiment was conducted under the Agriculture science under-Graduate programme of Lovely professional university Phagwara (Punjab); to determine the yield and growth parameters of mung bean under different spacing.The Experiment included 6 treatments of different spacing with different sowing method in 6 plots .Two plots with raised bed in which one plot have spacing 30 cm while other have spacing 20 cm (row to row spacing) and plant to plant spacing is 7cm. . Two plots with flat bed method one have spacing 30 cm and other 20 cm row to row spacing while plant to plant spacing is same for both 7cm , and two plots with Ridge and furrow method in which one plot have spacing 30 cm and other 20 cm row to row spacing and plant to plant spacing is 7cm . The data of the Germination percentage ,no. of branches , no. of leaf, leaf size , no. of pods and pods length was recorded periodically.The result showed that 30cm spacing with Raised bed produced taller plant , Highest no. of leaves per plant , more no. of pods per plant , more no. of branches per plant in case of Raised bed method of sowing. The 20 cm spacing (row to row spacing) gives poor performance in all the sowing methods as compare to 30 cm spacing with Raised bed.The result showed that 30 cm spacing gives highest yield combines with Raised bed condition as compare to 20 cm spacing with Ridge and furrow , flat and Raised method of sowing.

Keywords ***Mung bean , yield , Growth ,pods,germination***

1. INTRODUCTION

Mung bean (*Vigna radiata*) is excellent source of high quality protein. It belongs to family Fabaceae and originated from India. It can be grown on wide range of soils but performs best in loamy soil with good drainage. It contains 24% protein, 1.3% fat, 4.1% fibres and 56.7 % carbohydrates and 3.5% minerals. It can be used as fodder or as an green manure crop. It is short duration legume crop and harvest within 60 – 90 days after sowing. India is the world largest producer as well as consumer of Mung bean. It produces about 1.5 to 2.0 million tons mung annually within about 3 to 4 million hectare area.Average productivity of mung bean is 500 kg per hectare. Green gram output accounts for about 10 – 12 % of total pulse production in the country. It is growing in Rajasthan, Uttar Pradesh, Andhra Pradesh, Bihar and Gujarat etc.. Rajasthan and Maharashtra

occupies first two position and contributing 45 % of total productivity of mung bean. Mung bean is 45 to 120 cm tall and it is a deep rooted plant.Lateral branches of roots contain nodules which contains nitrogen fixing bacteria. Leaves are alternate and trifoliate with long petiole. Stem covered with short,fine, brownish hair. Flowers are greenish to bright yellow. Seeds are small, slightlyflattened, and globular with green, yellow brown or with mottled testa. Mung bean needs high temperature, less humidity and moderate rainfall of about 60 - 80 cm waterlogging is fatal for root development and nitrogen fixation during early vegetative stage . The pH range of soil should ranges from 5 to 7 and temperature ranges from 25 – 35 c is optimum for normal crop growth.

2. GENERAL OBJECTIVE

- To study the effect of spacing on growth parameter and yield of mung bean
- To study the effect of different method of sowing on Germination percentage, growth and productivity of moongbean.
- To check the best method of sowing and optimum spacing for mung bean cultivation.
- To compare the different spacing and method of sowing in Mung bean.

3. MATERIALS AND METHODS

This experiment was conducted in a village Barana of Distt. Panipat, Haryana, India ,132103.This experimental area was located at 29.39076 Latitude and 77.13295 Longitude. The soil in which Experiment was conducted was sandy in nature and slightly acidic. The Experiment consists of 6 Treatment in terms of Two different spacing namely 30 cm and 20 cm (row to row spacing) and plant to plant spacing is 7cm with Three different sowing methods namely Ridge and furrow method, Raised bed and Flat -bed method of sowing in a 300 sq. meter area (Each plot having 50 square meter area). To obtain the result in this experiment a few parameter was recorded after the sowing of the crop like ;Germination date ,Germination percentage ,no. of leaves,no. of branches per plant , leaf length , Flowering time and no. of pods ,pod length.

3.1 Germination Date

It is the date on which the seeds sown in a treatments was germinated.

3.2 Germination Percentage

It is the ratio of the percentage of seeds germinated to the no. of seeds sown.

3.3 Plant Height

It is the measurement of the total height of plant from the base to the tip of the highest leaf.

3.4 Leaf length ,Leaf width

It is recorded by measuring the length of leaf of the plant .

3.5 Number of Leaves

It is recorded by measure the total no. of leaves of the plant

3.6 Number of Branches

It is recorded by measure total number of branches per plant

3.7 Number of pods

It is recorded by measure the total number of pods per plant.

3.8 Pod length

It is recorded by measure pod length pod length

Most of these parameters are recorded from a few healthy looking plants in a randomly selected area of 1 square meter area. All the parameter expect Germination data and Germination percentage recorded at regular interval of 10 days , to determine the growth performance of plant in different treatment.

4. RESULT AND DISCUSSION

From this experiment and observation made it is clear that the spacing at which the seeds of mung bean are sown with different methods of sowing significantly influence the germination and growth parameter of mung bean and yield.The result showed that spacing and sowing method is a deciding factor for germination percentage, height of plants,leaf length, number of . of branches per plant , number of pods per plant and yield of plant.The spacing with diffirent sowing method uniformly affected the plant at 10 DAS, 20DAS,30 DAS AND 40DAS,50DAS (Days After Sowing).. The different parameter were recorded periodically throughout the experiment and it was observed that crop sowing at spacing 30 cm under Raised bed condition performed best ,followed by crop sowing at 30 cm and 20 cm spacing with Raised bed ,Flat bed and Ridge and furrow method in the remaining plots showed the least performance along with less no. of pods and height of plant and yield. The justification and reasons for the results obtained is still in accordance with previous finding like the ones done by Ram et al. 2001 and sing et al. 2011 and M.H. Kabir in 2006.

4.1 Germination Date

After 4 days of sowing mung bean starts germinate ,However there is significant diffirence in germination time .The seed sown at spacing 30 cm with Raised method of sowing emerged first followed by spacing 20 cm and 30cm sapcing with flat bed, Raised bed and Ridge and furrow method of sowing.This happened because Raised bed avoids waterlogging in rainy days and 30cm spacing provide enough space for plant to get optimum sunlight and nutrients from soil surface , prevents overcrowding of plants.

4.2 Germination percentage

After 10 days of sowing ,Germination percentage was calculated by counting number of plants from 1 sq. Meter area in each plot .This was highest at 30cm spacing (row to row spacing)with Raised bed and Least percentage in 20cm spacing with flat bed method of sowing .There was a significant difference in mung bean germination percentage .As the spacing decreased the germination percentage also decrease .This might be due to decrease in spacing also decrease the space for growth and Development of plant and creates overcrowding in plant population.Thus result is in confirmity with the Finding of M.H. Kabir and M.A.R Sarkar in 2003 reported that 30 cm spacing gives more no. of branches, more no. of leaf and yield in Raised bed condition.

4.3 Plant Height

Ater 10 days of sowing plant height was measured at regular intervel up to the flowering stage .There was a significant difference in plant height in (Fig 1). At all recording intervals and Growth stage of crop under experiment the plants in 30 spacing with Raised bed was best in all parameters ,followed by 20 cm and 30 cm spacing with flat method ,Raised bed and Ridge furrow method of sowing . Although there was a few exceptions and variations but result was fairly confirm. This may be due to the fact that plant under raised bed condition avoids waterlogging due to draining excess water from surface and avoids excess moisture in soil and 30 cm spacing provide more spacing to plant for growth and development.

4.1 Number of Leaves

Ater 10 days of sowing the number of leaves count from randomly selected 3 plants upto the flowering stage in each plot**.** There was a Significant difference in leaves number (Fig2).The maximum leaf number was recorded in raised bed with 30cm spacing(row to row) followed by Flat -bed method with 20 cm spacing have least number of leaves. So that as spacing decrease the no. of leaves also decrease. Generally the spacing and method of sowing is an important factor which determines the growth and performance of crop.

4.5 Leaf Length , Leaf width

3 Leaves are selected from each plot and then measured leaf length and width regularly up to flowering stage and then observed. There was a significant difference in mung bean leaf length and leaf width among the treatment as in (Fig3,4). The maximum leaf length and leaf width was recorded in Raised bed with 30 cm spacing (row to row spacing) .However the lowest leaf length and leaf width was recorded in flat bed with 20 cm(row to row) spacing. Therefore 30 cm is optimum spacing in raised bed to get proper sunlight and enough space for growth of crop. These result implied that an optimum number of leaves at flowering in Moongbean are obtained when there is a combination of Raised bed with 30 cm row to row spacing.

4.6 Number of Branches

During flowering stage 3 random plants were selected from each plot and number of branches per plant counted.There was a significant difference in number of branches per plot (Fig5).plant at 30 cm spacing with Ridge and furrow and Raised bed have highest number of branches However 20 cm spacing and 30 cm spacing with Flat and raised ,Ridge and furrow have least number of ,branches. The result concluded that Raised bed with 30 cm spacing and Ridge and furrow with 30 cm shows highest number of branches per plant.

4.7 Number of pods per plant

After 45 days of sowing 3 plants were selected random from each plot and the number of pods on them counted , At that time pods are greenish in colour and newly pods arrived before a week ago. .There was significant difference in pods number per plant (Fig 6). From the Result Plants in 30 cm spacing (row to row) with raised bed have highest pod number and least no. of pods in Ridge and furrow method with 20 cm (row to row) spacing. These results were a confirmation of Rasul et al. (2012) who reported that inter row spacing significantly affected the number of pods per plant in Mung bean.

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4.8 Pod Length

The Length of pods measured from randomly selected 3 plants from each plot after 50 days of sowing , The pods start emerging after 50 days of sowing and yet greenish in colour. And newly pods was yet arrived . There was significant difference in pod length (Fig. 7).The highest pod length recorded in Raised bed and flat bed with 30 cm spacing (row to row) ,However the least pod length recorded in flat bed with 20 cm spacing(row to row). The result indicates that 30 cm spacing with raised bed gives more pod length due to more space for growth and for proper sunlight as compare to 20 cm spacing.

5.FIGURE

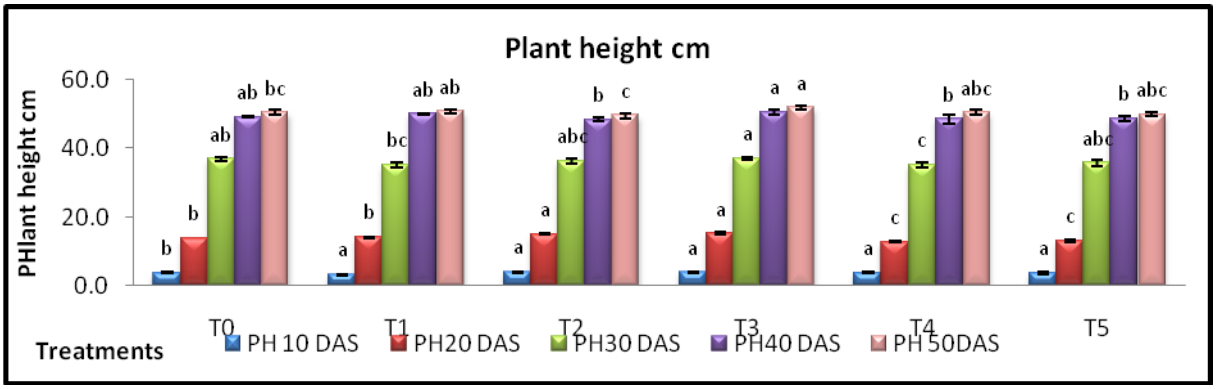

Fig.1 Representing the Plant height (cm).Data shown as mean of S.E. means with same letters for each figure are not significantly different according to LSD at p<0.05

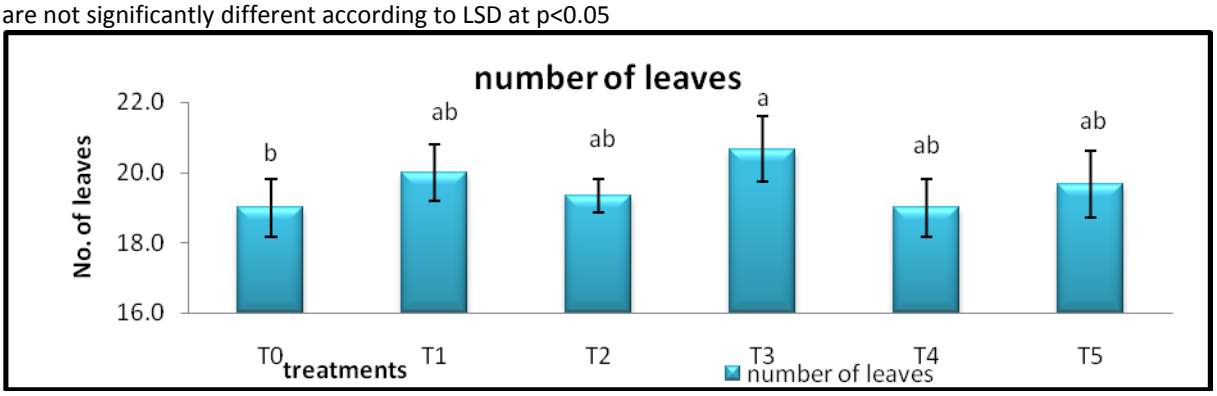

Fig.2Representing the number of leaves per branch. Data shown as mean of S.E. means with same letters foreach figure are not significantly different according to LSD at p<0.05

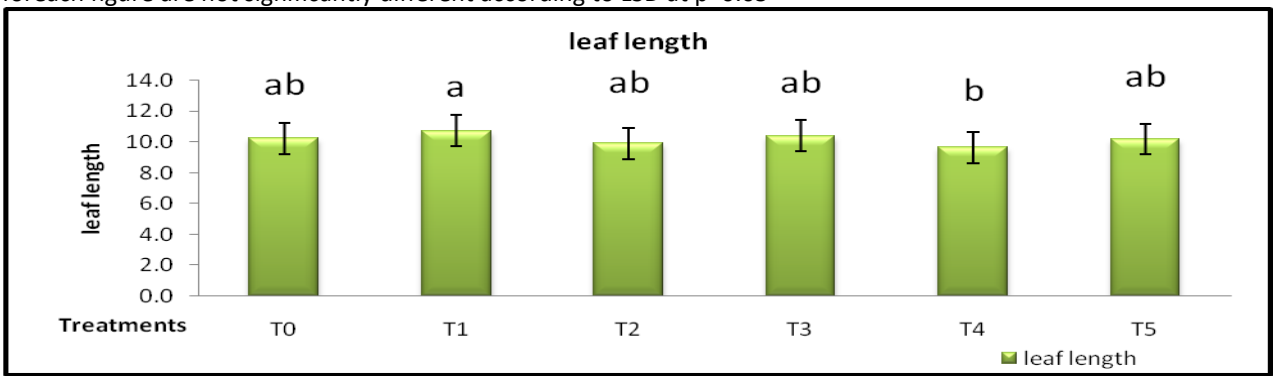

Fig.3 Representing the leaf length (cm).Data shown as mean of S.E. means with same letters for each figure are not significantly different according to LSD at p<0.05

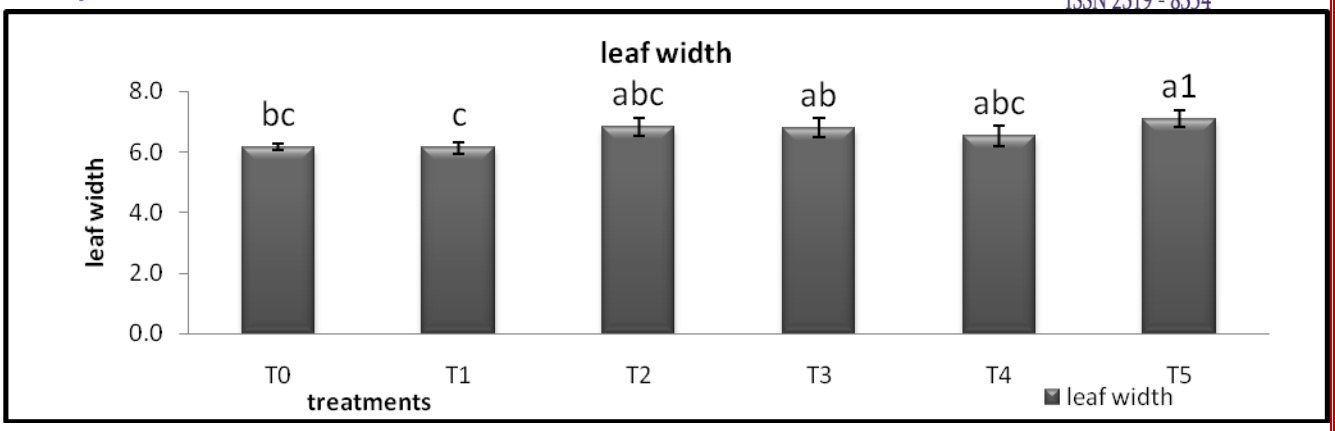

Fig.4 Representing the leaf width (cm).Data shown as mean of S.E. means with same letters for each figure are not significantly different according to LSD at p<0.05

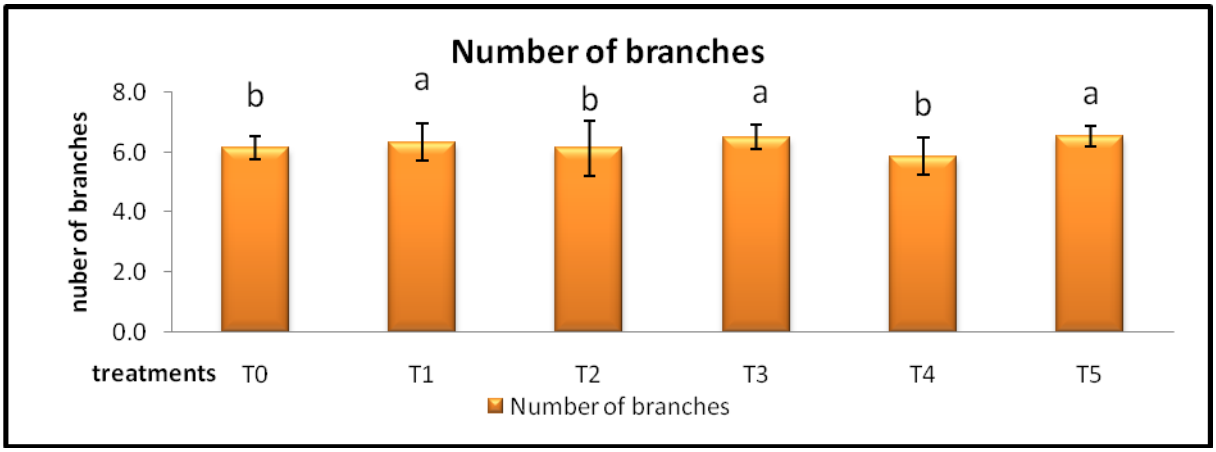

Fig.5 representing the number of branches per plant. Data shown as mean of S.E. means with same letters for each figure are not significantly different according to LSD at p<0.05

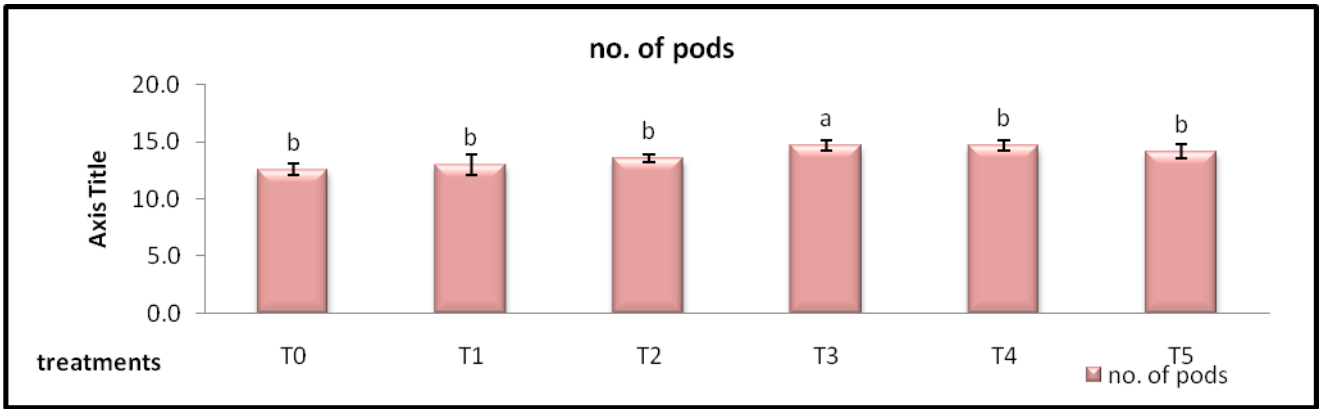

Fig.6representing the number of pods per plant. Data shown as mean of S.E. means with same letters for each figure are not significantly different according to LSD at p<0.05

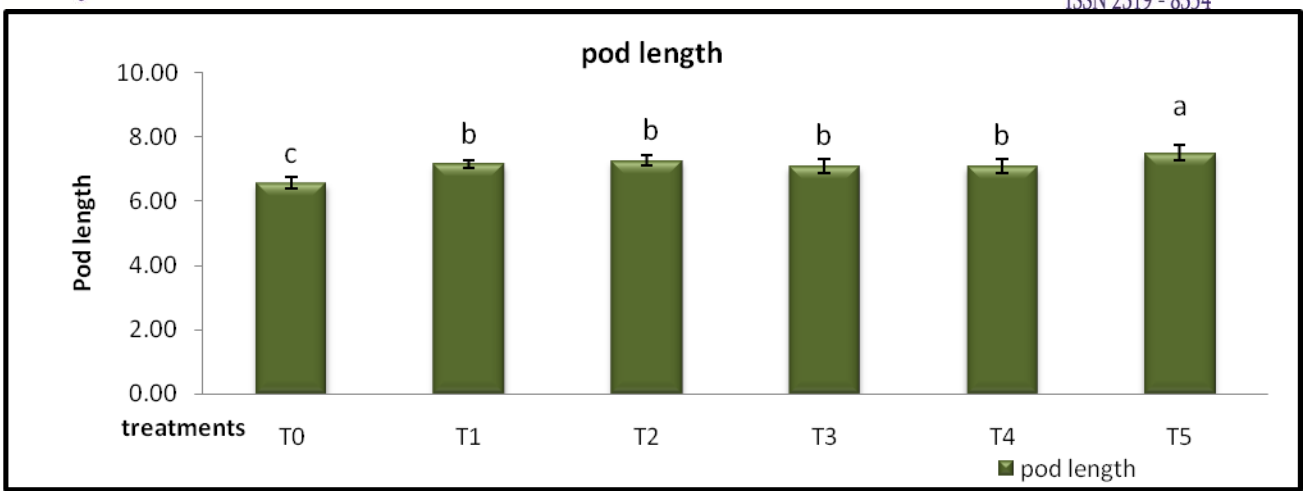

Fig.7 representing the pod length(cm) per plant. Data shown as mean of S.E. means with same letters for each figure are not significantly different according to LSD at $p<0.05$

6. CONCLUSION

This experiment aimed at determining the effect of spacing with diffirent methods of sowing on growth performance and yield of mung in sandy soil of village Barana ,Distt. Panipat in Haryana (India) . consequently,this experiment concludes first ,that spacing significantly affect height of plant , germination ,germination percentage ,number of leaves ,leaf length and width , number of pods per plant and pod length.The spacing which gives optimum growth performance and yield is 30 cm. Secondly ,This experiment concludes that growth performance and yield are significantly affected by method of sowing.The method of sowing which gives optimum plant height ,number of leaves ,number of branches , Leaf length and Leaf width and pod number ,pod length etc is Raised bed. Finally ,this experiment showed that combining with spacing of 30 cm(row to row) with Raised bed method of sowing had a significant effect on growth and yield of mung bean in Barana viilage of panipat ,Haryana. It suffices to conclude that economic production can be attained with this combination..Therefore Mung bean should be sown at appropriate spacing with good method of sowing to get the good growth and economic production ..

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