



QUANTITATIVE ANALYSIS OF MUNGBEAN PRODUCTION: A MORPHOLOGICAL APPROACH

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1/BSAB/B

CROP PRODUCTION SCIENCE

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INTRODUCTION

Mungbean or green gram (*Vigna radiata*(L.), R.Wilczek) has been cultivated in India since prehistoric times and is believed to be a native crop of India (Vavilov, 1926). It is cultivated throughout Southern and Eastern Asia, Central Africa, some parts of China, South and North America and Australia, particularly for its protein-rich grains. Mung bean is a warm seasonal annual legume, grown mostly as a rotational crop with cereals like wheat and rice.

Biochemical analyses in previously published studies reveal that mung bean and its processed products are rich in nutrients. Chemistry and technology of mung bean have been reviewed previously by Adsule et al. (1986), who provided substantial information on the nutritional aspects, but only gave limited information on processing of mung bean.

According to Kramer and Boyer (1997), Crop yield of Mung bean is more dependent on an adequate supply of water than on any other single environmental factor. Among the favorable characters of growing Mung bean short-term growth, nitrogen fixation capability, soil reinforcement and prevention of soil erosion are in top. Mung bean is popular as inter crop, or as mixed crop with cash crops.

Due to the condition of temperature in Kabacan, North Cotabato, according to Thomas et al. (2004), Mung bean plants under water stress attained maturity earlier than the well-watered treatment. Drought tolerance at the reproductive stage is the most important in terms of economic yield. Environmental stresses adversely affect growth and productivity of plants, particularly those which are sensitive to salinity and alkalinity (Islam 2011).

Mungbean seed contains 1.3% fat, 5.4% carbohydrates, 25.67% protein, 3.5-4.5% fibers and 4.5-5.5% ash, while calcium and phosphorus are 132 and 367 mg per 100 grams of seed, respectively (Frauque et al. 2000). It is highly nutritious and the green pods are eaten as vegetable. Being a legume, it enriches soil health through biological N fixation and is the Mung bean seed contains 1.3% fat, 5.4% carbohydrates, 25.67% protein, 3.5-4.5% fibers and 4.5-5.5% ash, while calcium and phosphorus are 132 and 367 mg per 100 grams of seed, respectively (Frauque et al. 2000).

It is highly nutritious and the green pods are eaten as vegetable. Being a legume, it enriches soil health through biological N fixation and is the cheapest source of dietary protein for human and livestock. Mung bean helps to reduce the cost for nitrogen fertilizers through symbiotic association of roots and rhizobia as reported by Limpens and Bisseling (2003) source of dietary protein for human and livestock. Mung bean helps to reduce the cost for nitrogen fertilizers through symbiotic association of roots and rhizobia as reported by Limpens and Bisseling (2003).

Additionally, the balance of imbibition forces of seeds and osmotic forces of soil solution are the determining fact for water uptaking in germination. The lowering water uptake and inhibiting activities of hydrolytic enzymes are the main reason for retarding the seed germination during salt stress (Dubey and Rani 1990; Kumar et al. 1996).

OBJECTIVES

This study sought to;

- To quantify and analyze the morphological changes that occur during the development of mung bean (*Vigna radiata*) from germination to maturity.
- To quantify the rate of stem elongation and leaf area expansion.
- To assess the development of the root system, including root length and biomass.
- To determine the timing and duration of flowering and pod development.
- To quantify the number of pods and seeds per plant.
- To measure and analyze the size and shape of pods and seeds at different stages of maturity.

MATERIALS AND METHOD

MATERIALS

- Mung bean seeds

- Urea Fertilizer
- Branch of sticks for support to the stem and roots, tie box
- Water
- Photosynthesis- support from light
- Ruler for data collection
- Weighing scale for the biomass

METHODS

- Arrange the exact measurement of the plot (length and width in CM).
- Prepare sticks to support the future stem of the pod.
- Provide a specific measurement for the pod seedlings.
- After putting the seeds into the hole, cover the hole together.
- Water the area and make sure to put enough water.
- If the plant will grow 2 weeks after, put a fertilizer centimeters away from the plant.
- Maintain taken care of the plant until it flowers.
- Fast forward to the harvest, make sure to record all the data.
- Record the height of the plot, height of the plant thru sample sizes, size of the leaf, size of the pod, number of seeds, and biomass of the pods.

HARVEST (RAW DATA COLLECTION)

Table 1. Plant and Leaves Sizes

SAMPLE PLANT	HEIGHT OF THE PLANT IN CM	NUMBER OF LEAVES	SIZE OF LEAVES (1 sample per plant)
1	64	39	13
2	65	45	10
3	85	35	8
4	87	37	16
5	64	40	15
6	54	30	16

7	43	36	8
8	47	36	7
9	57	35	14
10	89	37	13

Table 2. Plot parameter of mung bean

PLOT		IN BETWEEN ROWS	IN BETWEEN HILLS	INCHES DEEP	SEEDS
LENGTH	WIDTH				
550 cm	80cm	18cm	13cm	1-2 inch	3-4 seeds

Table 2 shows the plot parameter of the mung bean in which its length has 550 cm height and its width is 80 cm height. In the case of plotting the hole for the mung bean planting the rows between us 18cm and between hills is 13 cm. While the plot is ready make sure to hole it at least 1-2 inches and the seeds needed are around 3-4 seeds.

Table 3. Mung bean first harvest.

SAMPLE PLANT 1 ST HARVEST	Total Pods	Total measure heights of pods	Weight of the total pods (g)	Total no. of seeds of pods	Weight of thousand seeds (g)
1	30	232 cm	12 g	303 seeds	
2	18	121.9 cm	8 g	150 seeds	
3	17	119.3 cm	6 g	137 seeds	
4	13	94.8 cm	8 g	126 seeds	
5	27	197 cm	11 g	150 seeds	
6	35	300.5 cm	12 g	343 seeds	
7	46	374 cm	21 g	512 seeds	
8	18	148.6 cm	20 g	156 seeds	
9	38	319.2 cm	24 g	373 seeds	
10	42	357 cm	30 g	473 seeds	
TOTAL	284	2, 264.3 cm	152g	2723 seeds	193 g

Our first harvest was November 6, 2024. Table 3 representing the total parameters of the mung beans during our first harvest. It was shown in table that the total pods is 284, the total measure heights of pods is 2, 264.3 cm, weight of the total pods is at 793 g, and the total number of seeds over all is around 2723 seeds.

Table 4. Mung bean second harvest.

SAMPLE PLANT 2 nd HARVEST	Total Pods	Total measure heights of pods	Weight of the total pods (g)	Total no. of seeds of pods	Weight of thousand seeds (g)
1	40	330 cm	23 g	423 seeds	
2	15	108cm	8 g	141 seeds	
3	16	120 cm	8 g	140 seeds	
4	12	96 cm	8 g	122 seeds	
5	30	205.6 cm	28 g	150 seeds	
6	36	310.5 cm	20 g	350 seeds	
7	50	380 cm	30 g	530 seeds	
8	20	150.6 cm	21 g	160 seeds	
9	45	365.2 cm	22 g	490 seeds	
10	40	325 cm	17 g	380 seeds	
TOTAL	304	2,010.9 cm	175g	2,886 seeds	217g

Our second harvest was November 11, 2024. Table 4 representing the total parameters of the mung beans during our second harvest. It was shown in table that the total pods is 304, the total measure heights of pods is 2010.9 cm, weight of the total pods is at 854 g, and the total number of seeds over all is around 2886 seeds.

Table 5. Mung bean third harvest.

SAMPLE PLANT 3 rd HARVEST	Total Pods	Total measure heights of pods	Weight of the total pods (g)	Total no. of seeds of pods	Weight of thousand seeds (g)
1	12	89 cm	10 g	120 seeds	
2	9	90.6cm	8 g	90 seeds	
3	7	70.7cm	6 g	70 seeds	

4	15	150.2 cm	13 g	150 seeds	
5	14	140 cm	10 g	140 seeds	
6	11	110.5 cm	8 g	110 seeds	
7	8	80.8cm	6 g	80 seeds	
8	10	100.2 cm	8 g	100 seeds	
9	13	130.7m	11 g	130 seeds	
10	16	160 cm	14g	160 seeds	
TOTAL	115	1,122.7cm	94 g	1,150 seeds	124g

Our second harvest was November 20,2024. Table 5 representing the total parameters of the mung beans during our second harvest. It was shown in table that the total pods is 115, the total measure heights of pods is 1,122.7 cm, weight of the total pods is at 94 g, and the total number of seeds over all is around 1,150 seeds.

Table 6. Mung bean 4th harvest

SAMPLE PLANT 4 th HARVEST	Total Pods	Total measure heights of pods	Weight of the total pods (g)	Total no. of seeds of pods	Weight of hundreds seeds (g)
1	8	47 cm	2 g	48 seeds	
2	9	50cm	3 g	47 seeds	
3	7	42 cm	2 g	30 seeds	
4	5	20 cm	1 g	27 seeds	
5	0	0 cm	0 g	0 seeds	
6	4	12 cm	2 g	20 seeds	
7	8	46 cm	2 g	45 seeds	
8	7	39 cm	2 g	28 seeds	
9	5	25 cm	2 g	25 seeds	
10	9	53 cm	3 g	57 seeds	
TOTAL	62 pods	334 cm	19 g	327seeds	36 g

Our fourth harvest was November 26, 2024. Table 6 representing the total parameters of the mung beans during our second harvest. It was shown in table that the total pods are 62, the total measure heights of pods is 334 cm, weight of the total pods is at 19 g, and the total number of seeds over all is around 327 seeds.

Table 7. Mung bean 5th harvest

SAMPLE PLANT 5 th HARVEST	Total Pods	Total measure heights of pods	Weight of the total pods (g)	Total no. of seeds of pods	Weight of hundred seeds (g)
1	0	0 cm	0	0	
2	0	0 cm	0	0	
3	5	25 cm	2	25	
4	2	8 cm	1	9	
5	0	0 cm	0	0	
6	9	56cm	5	53	
7	5	23cm	3	29	
8	2	7cm	1.1	49	
9	7	28cm	4.3	35	
10	9	36cm	5.6	31	
TOTAL	39 pods	183 cm	22 g	231 seeds	43 G

Our fifth harvest was December 4, 2024. Table 7 representing the total parameters of the mung beans during our second harvest. It was shown in table that the total pods are 39, the total measure heights of pods is 183 cm, weight of the total pods is at 22 g, and the total number of seeds over all is around 231 seeds.

RESULTS AND DISCUSSION

On the first table, it was shown there the table of the plant parameter, which covers the plant height, leaf sizes, and number of leaves. In which we determine it with those pods that have been harvested by my group mates. Additionally, in terms of the production of the mung bean, we used non-organic, which helped the mung bean to grow and produce pods. As you can see, on our first harvest, we harvested a lot of pods. If you will, based on the parameters provided by the researchers, you can see that there are a lot of pods and seeds, as well as their pod heights and grams. On our second harvest, we also

harvested a lot of pods since it is the second priming, and it doesn't limit the growth of pods since there are some greeny pods that are not good to harvest. On our third, it lessens the number of pods we harvested since we are waiting for the green pods that have been observed during our second harvest. On our fourth harvest/priming, we harvested the pods from the 10 sample plants, and after that, we harvested the existing ones. As you can see, on the fourth harvest table, there are small amounts of pods. Lastly, on our fifth harvest, there are sample plant that do not have a

CONCLUSION

To further conclude this study, the researcher would like to present the following: Before we harvest, we measure the plant height and its parameters, after that we also measure the pods. All in all, as a researcher, I observe that if we plant even if a plant came from the leguminous family, we also need to maintain. The use of fertilizer should be exact to its plant characterization. The 4 priming shows the number of pods with its respective seeds and pod heights. I observed that mung bean cannot be harvested twice but thrice or even quarter as long as it bears.

PROBLEM ENCOUNTERED

- No cover crop planted near our plot.
- Lack of materials used for maintaining the plant.
- We did not use insecticide, pests are more open to eat the leaves.
- There are plants that lack support from the sun, not really exposed.
- Our plot is far away from the irrigation.
- At first, we mistook putting fertilizer because it should be cm's away, but rather we put it 1 cm away which is not applicable to the plant.
- During our harvest, the problem we encountered is that, we do not have enough knowledge how to get the raw data but we manage to fix it through the help of our adviser, Ma'am Cunanan.
- We had difficulties in separating the damaged seeds, big, and small seeds.
- Inactive GROUPMATES.

DOCUMENTATION



RECOMMENDATION

- The plot should be maintained everyday.
- The plot should be near the irrigation.
- Use enough and correct fertilizer.
- Use pesticide based on the plant needs because mung bean is prone to ladybugs and worms.
- Plant a cover crop near the plot so that it can be served as protection to the wind and flood.
- Plot height in centimeters should be exact and the distance of the planted mung beans.
- Make sure that the plot where you planted your seeds is exposed to the capturing of sunlight.

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