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To compare two varieties (Banshi and IPM 0203) of Mung Bean (Vigna radiata L.) for their morphological and yield contributing factors under irrigated and rainfed conditions

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ABSTRACT

A field experiment was conducted at village 2 LLG, Dist. Sri Ganganagar, Rajasthan to determine the effect of irrigated and rainfed condition on the morphological and yield attributing characters of two varieties (Banshi and IPM-0203) of Mung bean in Kharif season 2017. The morphological and yield contributing characters like average number of pods per plant, number of grains per pod, dry matter accumulation per plant and yield were studied under irrigated and rainfed conditions. The following treatments were applied consisting of T_1=Irrigation at regular intervals (in which two plots were prepared for the sowing of two varieties V_1 and V_2) and treatment T_2= with no irrigation i.e rainfed conditions preparation of field (in which two plots were prepared for the sowing of two varieties V_1 and V_2). The parameters studied gave better results in variety V_1 (Banshi) under both irrigated and rainfed conditions as compared to variety V_2(IPM-0203).

Keywords: Biometric parameters, irrigation conditions, Mung bean, Varieties, Yield.

I. INTRODUCTION

Mungbeans are in the Legume family of plants and are closely related to adzuki and cowpea (in the same genus but different species). They are warm season annuals, highly branched and having trifoliate leaves like the other legumes. Both upright and vine types of growth habit occur in mungbean, with plants varying from one to five feet in length. The pale yellow flowers are borne in clusters of 12–15 near the top of the plant. Mature pods are variable in color (yellowish-brown to black), about five inches long, and contain 10 to 15 seeds. Self pollination occurs so insect and wind are not required. Mature seed colors can be yellow, brown, mottled black or green, depending upon variety. These round to oblong seeds vary in size from 6,000 to over 12,000 per pound, depending upon variety. Germination is epigeal with the cotyledons and stem emerging from the seedbed. (Oplinger *et al* [1]). Mungbean is one of the most important pulse crops for protein supplement in subtropical zones of the world. It is widely grown in Indian subcontinent as a short duration catch crop between two principal crops. Mungbean contains 51% carbohydrate, 24–26% protein, 4% mineral, and 3% vitamins. Besides providing protein in the diet, mungbean has the remarkable quality of helping the symbiotic root rhizobia to fix atmospheric nitrogen and hence to enrich soil fertility (Mondal *et al* [2]). This present study done on mung bean

varieties under irrigated and rainfed conditions would help farmers to cultivate best suitable variety under appropriate water availability either in irrigated or rainfed conditions.

II. MATERIAL AND METHODS

The experiment was carried out at Village 2 LLG, District Sri Ganganagar, during *kharif* season 2017. Treatments were allocated in 4 plots with each plot having dimensions of 5 m × 5 m. The treatments consisted of T_1=Irrigation at regular intervals (in which two plots were prepared for the sowing of two varieties V_1 and V_2) and treatment T_2= with no irrigation i.e rainfed conditions preparation of field (in which two plots were prepared for the sowing of two varieties V_1 and V_2), pre sowing irrigation (*rauni*) was given and then field was ploughed once and twice with disc harrow and cultivator respectively followed by planking. Mung bean varieties V_1 (Banshi) and V_2 (IPM -0203) was sown on JULY 4, 2017 with the help of manually operated seed drill. Crop was raised according to the recommended package of practices under irrigated culture. Crop was harvested on September 30, 2017 and threshed on October 2, 2017. Grain yield obtained from plot was then converted to q/acre. Observations recorded were average number of pods per plant, average number of grains per pod, dry matter accumulation per plant and yield.

III. RESULTS AND DISCUSSION

3.1 Average number of pods per plant

Maximum pods per plant (34.33) was observed under irrigated conditions by the variety V_1 (Banshi) but significance decrease in number of pods per plant (27.33) was observed in variety V_2 (IPM-0203) under rainfed conditions (Table 4.1). Asduzzaman *et al* [3] and Sadeghipour [4] reported that irrigated conditions gave more number of pods per plant in mung bean as compared to rainfed conditions.

3.2 Average number of grains per pod

The data on number of seeds per pod as influenced by different treatments are presented in Table 4.2. A perusal of data reveals that in both varieties more number of grains per pod (10.1 and 8.9) was found under irrigated conditions as compared to rainfed conditions (8.6 and 7.1). Malik *et al* [5] also reported similar results i.e more number of grains per pod was found under irrigated conditions in mung bean.

3.3 Dry matter per plant

The maximum dry matter accumulation per plant was in V_1 (Banshi) at 80 DAS i.e 20.4 gm while the minimum dry matter accumulation per plant was observed in variety V2 (IPM-0203) at 80 DAS i.e 19.1 gm under irrigated conditions. Dry matter accumulation under rainfed conditions was maximum in V_1 (Banshi) at 80 DAS i.e 19.5 gm whereas minimum dry matter accumulation per plant variety V_2 (IPM-0203) at 80 DAS i.e 18.2 gm under rainfed conditions (4.3). Mansur *et al* [6] also observed that irrigated conditions gave more dry matter weight as compared to other rainfed conditions.

3.4 Yield

The evaluation of data for maximum yield as influenced by different treatments are presented in Table 4.4. A perusal of data reveals that both varieties produced more yield per acre (5.2 quintal and 4.7 quintal) than under

rainfed conditions (i.e 4.4 quintal and 3.6 quintal). Khamssi *et al* [7] also noted that grain yield per unit area significantly reduced as a result of water deficit stress.

IV. TABLES

Table 4.1 Effect of irrigated and rainfed conditions on average number of pods per plant of two different varieties of mung bean

Treatments	Average number of pods per plant
Irrigated conditions	
V_1	34.33
V_2	30.33
Rainfed conditions	
V_1	29.33
V_2	27.33

Table 4.2 Effect of irrigated and rainfed conditions on average number of grains per pod of two different varieties of mung bean

Treatments	Average number of grains per pod
Irrigated conditions	
V_1	10.1
V_2	8.9
Rainfed conditions	
V_1	8.6
V_2	7.1

Table 4.3 Effect of irrigated and rainfed conditions on the dry matter accumulation per plant of two different varieties of mung bean

Treatments	Dry matter accumulation per plant (20 days interval)			
	20 DAS	40 DAS	60 DAS	80 DAS
Irrigated conditions				
V_1	1.3 gm	8.2 gm	15.6 gm	20.4 gm
V_2	1 gm	7.5 gm	14.1 gm	19.1 gm
Rainfed conditions				
V_1	1.1 gm	7.3 gm	14.4 gm	19.5 gm
V_2	0.8 gm	6.9 gm	13.8 gm	18.2 gm

Table 4.4 Effect of irrigated and rainfed conditions on total yield of two different varieties of mung bean

Treatments	Yield per acre
Irrigated conditions	
V_1	5.2 quintal/acre
V_2	4.7 quintal/acre
Rainfed conditions	
V_1	4.4 quintal/acre
V_2	3.6 quintal/acre

V. CONCLUSION

It has been concluded from this experiment that following character like (average number of pods per plant, average number of seeds per pod, dry matter accumulation per plant and total yield) of variety V_1 (Banshi) were considered best as compared to variety V_2 (IPM-0203) under both irrigated and rainfed conditions. From the present investigation it has also been observed that if mung bean is grown under rainfed conditions the morphological and yield contributing characteristics would not give their best results because the biometric parameters require sustainable water availability.

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