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Jnanesha AC
CSIR-Central Institute of Medicinal and Aromatic Plants, Research Centre, Boduppal, Hyderabad, Telangana State, India

Nagaraj S
CSIR-Central Institute of Medicinal and Aromatic Plants, Research Centre, Boduppal, Hyderabad, Telangana State, India

Ashish Kumar
CSIR-Central Institute of Medicinal and Aromatic Plants, Research Centre, Boduppal, Hyderabad, Telangana State, India

Vanitha TK
CSIR-Central Institute of Medicinal and Aromatic Plants, Research Centre, Boduppal, Hyderabad, Telangana State, India

Correspondence
Jnanesha AC
CSIR-Central Institute of Medicinal and Aromatic Plants, Research Centre, Boduppal, Hyderabad, Telangana State, India

Performance of different cultivars of Mung bean in Northern transition Zone of Karnataka

Jnanesha AC, Nagaraj S, Ashish Kumar and Vanitha TK

Abstract
The field experiment was conducted at puchaladinni village of Raichur district to know the performance of different cultivar of mung bean in Northern transition zone of Karnataka during the year 2014-15. From the data gathered it can be found that, among the different cultivars of mung bean. The variety SML 668 recorded significantly higher seed yield (985.2 kg/ha) compared to rest of the cultivars and was followed by PDM 139 (913.2 kg/ha). Significantly lower seed yield was recorded in DGGV 2 (701.3 kg/ha). The seed yield in SML 668 was higher to an extent 7.9%, 15.2 %, 23.9% and 40.4 % respectively over PDM 139, BGS 9, SML 832 and DGGV 2. The plant height, no. of branches, dry weight, crop growth rate, and seed weight is also significantly higher compared to other cultivars.

Keywords: Mung bean cultivars, summer season, Northern transition zone

1. Introduction

Mungbean (*Vigna radiate* L. Wilczek.) is one of the most important pulse crops grown inthe arid and semi-arid regions of our country. It is a short duration kharif pulse crop which can be grown as catch crop between rabi and kharif seasons. During summer, it can also be used as a green manure crop. Being a leguminous crop, it has the capacity to fix atmospheric nitrogen. Its green plants are used as fodder after removing the mature pods. Mungbean is an excellent source of protein (25%) with high quantity of lysine (4600 mg/N) and tryptophan (60 mg/N) and consumed as whole grain as well as dal in variety of ways for table purposes. Mungbean is supposed to be easily digestible and hence is preferred by patients. When mungbean seeds are allowed to sprout, ascorbic acid (vitamin C) is synthesized. The amount of riboflavin and thiamine are also increased.

The total area under pulses is 22.47 million hectares with an annual production of 13.38 million tonnes in the country. In India, mungbean occupies 3.0 million hectares and contributes to 1.3 million tonnes in pulse production (Anonymous, 2006). The important mungbean growing states are Orissa, Maharashtra, Andhra Pradesh, Tamil Nadu, Uttar Pradesh, Madhya Pradesh, Rajasthan and Bihar. In Rajasthan, the total area under mungbean was 7,54, 598 hectares with the annual production of 2,05,068 tonnes and productivity of 272 kg ha -1 (Anonymous, 2005).

The mung bean varieties which is developed by Universities, and other central institution was evaluated in northern transition zone of karntaka to know adoptability with regard to growth and yield prior to this these varieties were not assessed under the existing condition before distributed to the farmer Therefore, it was becoming very important to collect different improved varieties to evaluate for their wider adaptability in Northern transition zone of Karnataka, India.

2. Materials and methods

The experiment was conducted at Puchaldini village in Raichur Taluk and District of Karnataka state in the year 2014 to know the performance of different cultivars of mung bean in summer season. The experimental plot is located at $75^{0}28^{1}$ east longitude and 260 051 Northern latitude with an altitude of 600 meters above mean sea level. In Karnataka this region falls under Northern transition zone of Karnataka. The climate of this region is typically semi arid characterized by high temperature during summer. During summers, the temperature may go as high as 40 ºC. The average rainfall of this tract ranges between 650-700mm rainfall. The soil of the experimental field was sandy loam in texture with Ph of 7.5 and poor in nitrogen an d phosphorous and medium in potassium. The experiment consists of 5 cultivars of mung bean viz., SML 668, PDM 139, BGS 9, SML 832 and DGGV 2. The experiment was laid out in Randomized complete block design with four replications. The treatment allocation was done randomly using random number table (Fisher, 1963).

Seeds of different cultivars of mung bean were sown by using open furrows behind plough method at 30 cm apart in rows. The seed is used for sowing per hectare is around 20 kg. Thinning, weeding and hoeing operation was carried out at different interval and harvesting was done based on maturity of the crop. The harvested produce from each plot was allowed to dry in sun. After drying, bundles of each plots along with pods picked up earlier were weighed for biological yield and threshed and winnowed manually and seed yield per plot was recorded. Periodical observation with regard to growth parameter and yield attributing character was taken. The statistical analysis of data pertaining to growth and yield characters was done by standard statistical methods of analysis of variance as described by Gomez and Gomez (1984) [4]. Significance of difference among treatment effects was tested by 'F' test. The critical difference at 5 per cent level was calculated wherever the differences were found to be significant.

3. Results and discussion

3.1 Growth parameter

3.1.1 Plant height (cm)

Among the different cultivars of mung bean, the variety SML 668 recorded significantly higher plant height (52.6 cm) compared to rest of the cultivar and was on par with BGS 9. Significantly lower plant height was recorded in SML 823 (46.2 cm).

This was due to the fact that plant height is a genetically controlled factor so the height of different varieties does not remain equal. As for the effect of environmental factors on plant height is concerned it could not be neglected but the selection of proper cultivar manages the influence of environment. These results are in corroborated with the findings of Ali (1994) [3] who also reported difference of plant height in different maize cultivars.

3.1.2 Dry weight at 60 DAS (g)

Dry weight of mung bean varied among different cultivar and SML 668 recorded significantly higher dry weight at 60 DAS (358.2g) compared to other cultivars and was followed by PDM 139 (339.4 g). Significantly lower dry weight was recorded in DGGV 2 (298.5 g). This might be attributed to genetic variation among different mung bean cultivar.

3.2 Yield attributing characters

3.2.1 No. of pods per plant

Among the different cultivars of mung bean, the variety SML 668 recorded significantly higher number of pods per plant (34.33) compared to other cultivars and was on par with PDM 139 (30.83). Significantly lower number of pods per plant was noticed in DGGV 2 (24.5). However, PDM 139 cultivars were on par with rest of the cultivars. Similar trend was noticed in weight of pods per plant with SML 668 recorded significantly higher weights per plant (24.12) compared to rest of the treatment and was on par with PDM 139 (21.2). Rest of the cultivars were on par with PDM 139 except DGGV 2. The number of pods per plant is a genetically controlled factor but environmental and nutritional level may also influence the number of pods per plant. Generally, grain yield is directly related to number of pods per plant.

3.2.2 Crop growth rate (g/m^2/day)

Mung bean cultivars differ significantly with regard to crop growth rate. Among different cultivars the variety SML 668 recorded significantly higher crop growth rate (9.6 g/m2/day) compared to rest of the treatment and was followed by PDM 139. Significantly lower crop growth rate was noticed in SML 832 (6.8 g/m2/day).

3.2.3 Thousand seed weight (g)

Seed weight differs significantly with regard to mung bean cultivars. SML 668 recorded significantly higher seed weight (64 g) compared to rest of the cultivar and was on par with SML 832 (62 g). Significantly lower seed weight was recorded in PDM 139 (57 g). The Variation in 1000-seed weight among the varieties of mungbean might be due to their different genetic characteristics. Similar trend was noticed by Samanta *et al.* (1999) [6].

3.3 Yield (kg/ha)

From the data gathered it can be found that, among the different cultivars of mung bean. The variety SML 668 recorded significantly higher seed yield (985.2 kg/ha) compared to rest of the cultivars and was followed by PDM 139 (913.2 kg/ha). Significantly lower seed yield was recorded in DGGV 2 (701.3 kg/ha). The seed yield in SML 668 was higher to an extent 7.9%, 15.2 %, 23.9% and 40.4 % respectively over PDM 139, BGS 9, SML 832 and DGGV 2. This attribute is might be due to superior genetic variability in SML 668 cultivars compared to other cultivars and also increase in growth and yield attributing character over other cultivar led to increase in seed yield compared to other cultivars. This attribute is might be due to genetic difference among the varieties. These findings are quite in line with the findings of Abbas (2000) [1] who had reported significant difference in the yield of various cultivars. These results are in agreement with the findings of Agarcio (1985) [2], Panwar and Sirohi (1987) [5] and Ali *et al*. (2010) [7].

3.4 Economics

From the data it can be found that the cultivar SML 668 which was grown in Northern transition zone of Karnataka recorded significantly higher Gross return (54175 Rs/ha), Net return (35675 Rs/ha) and benefit cost ratio (2.93) compared to rest of the cultivar and was followed by PDM 139 (50188 Rs/ha, 31688 Rs/ha and 2.71 respectively). Whereas, significantly lower gross returns, net returns and benefit cost ratio was noticed in DGGV 2 (38596 Rs/ha, 20096 Rs/ha and 2.09 respectively). Increase in gross return, net return and benefit cost ratio in SML 668 cultivar is due to higher seed yield compared to rest of the cultivars.

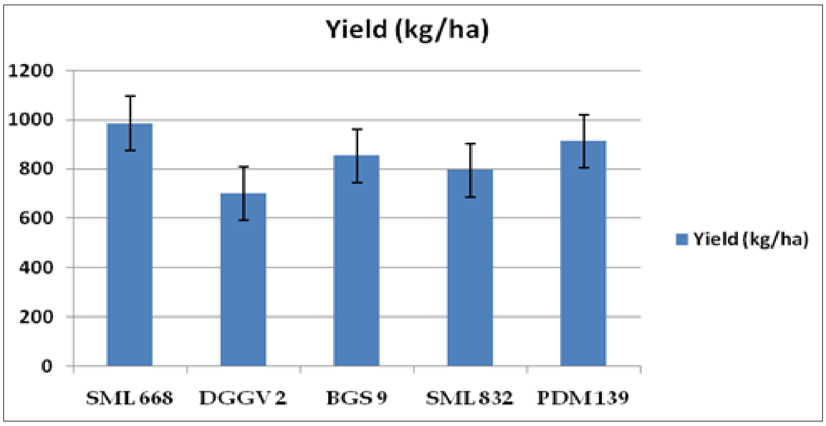

Fig 1: Yield of different cultivars of mungbean in Northern transition zone of Karnataka

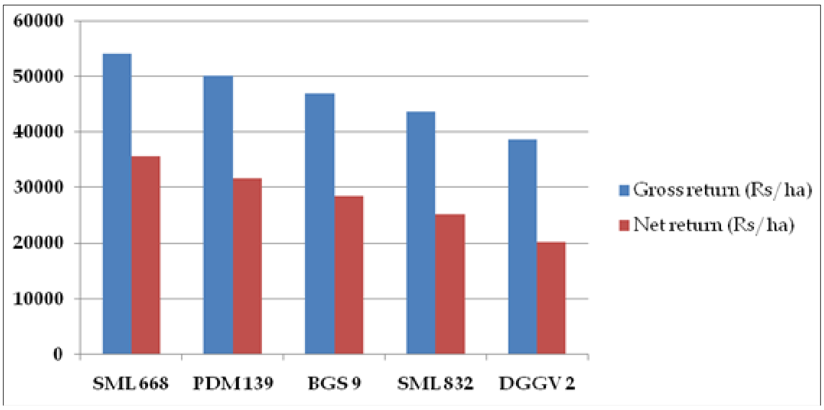

Fig 2: Gross returns (Rs/ha) and net returns of different cultivars of mungbean in Northern transition zone of Karnataka

Table 1: Growth and yield performance of different cultivar of mung bean in Northern transition zone of Karnataka

Cultivars	Plant height (cm)	No. of branches per plant	Dry weight at 60 DAS (g)	Crop growth rate ($g/m^2/day$)	No. of pods per plant (g)	Pod length (cm)	Seed weight (g)	Yield (kg/ha)
SML 668	52.6	5.2	358.2	9.6	34.33	7.4	64	985.2
PDM 139	48.7	4.8	339.4	9.3	30.83	7.1	57	912.3
BGS 9	50.8	5.0	328.2	8.7	28.54	6.8	58	854.7
SML 832	46.2	4.1	302.1	6.8	26.3	6.3	62	795
DGGV 2	47.3	3.8	298.5	7.1	24.5	6.4	59	701.5
SEm±	0.7	0.2	1.2	0.05	1.8	0.1	1.3	17.2
CD(P=0.05)	2.3	0.6	3.65	0.15	5.4	0.3	3.9	51.6

Table 2: Gross return, net return and benefit cost ratio of different cultivar of mungbean grown in Northern Transition zone of Karnataka

Cultivars	Gross return (Rs/ha)	Net return (Rs/ha)	Benefit cost ratio
SML 668	54175	35675	2.93
PDM 139	50188	31688	2.71
BGS 9	46998	28498	2.54
SML 832	43711	25211	2.36
DGGV 2	38596	20096	2.09
SEm±	907	907	0.03
CD(P=0.05)	3126	3126	0.11

4. Conclusion
From the data it can be concluded that among different cultivars of mung bean the variety SML 668 is found to be best cultivar in order to get higher seed yield and higher returns in Northern transition zone of Karnataka during summer season and was followed by PDM 139 which gives higher seed yield and returns compared to rest of the cultivars.

5. Acknowledgement
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