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Effect of Different Spacing on Yield of Summer Moong Variety SML 1827

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ABSTRACT

Summer moong is emerging as cash crop in Punjab where paddy-wheat rotation is followed on a large area. An experiment was conducted to find out the most suitable spacing for sowing of summer moong in order to get higher benefits by increasing grain yield. The trial was laid out in factorial RBD with 3 X 2 factors. In this trial, three row to row spacing and two plant to plant spacing were taken with three replications. Row to row spacing of 20cm, 22.5cm and 25 cm were taken along with spacing of 7.5cm and 10 cm. The grain yield obtained was 12.68q/ha and 13.05q/ha of the crop sown at 22.5cm X 7.5cm and 22.5cm X 10.0 cm spacing, respectively. Therefore, it was inferred that summer moong variety SML 1827 could be sown at a row to row spacing of 22.5 cm with plant to plant spacing of 7.5 to10.0 cm.

Key Words: Cash crop, Spacing, Summer moong, Yield.

INTRODUCTION

Moong(*Vigna radiata* L.) is one of the important leguminous crops grown for its nitrogen fixation properties . It is primarily a rainy season crop but also suitable as a summer crop under irrigated conditions. It is grown both in summer and rainy seasons, although, it is more popular among farmers during summer season. Summer moong is a versatile crop with major emphasis on it as a cash crop, in between two main crops such as paddy and wheat, as far as Punjab agriculture in concerned. Summer mungbean is usually sown from the late February to first week of April after the harvest of potato in Punjab. The growth and yield of mungbean is mainly influenced by planting density so proper row spacing needs to be standardized. some high-yielding, photo-insensitive varieties of mungbean have been developed and released in last two decades in the country, which need to be tested for their adoption under different agro- climatic situations. Kundu *et al* (2021) reported that mungbean sown at close row spacing (25 cm) resulted in greater grain (583.0 kg/ha) and straw yield (2415.7 kg/ha) than wider spaced crop (30 cm).

Mung bean plant fixing atmospheric N2 and enriches the soil with N nutrient for the growth of succeeding crops . On the other hand, the crop can be successfully grown on marginal lands where other crops perform poorly and most suitable for green manure use (Dainavizadeh and Mehranzadeh, 2013). The crop is a short-duration and low input required legume crop. Mung bean is a quick or very early maturing crop, which requires 75–90 days to mature. Mung bean has special features such as its earliness in maturity, supply good yield, drought resilient property makes highly responsive in scanty rainfall. Siraje *et al* (2020) reported that the yield and yield components parameters such as number of seeds per pod, thousand seeds weight, grain and biomass yields and harvest index were significantly affected by main and interaction effects of intra and inter row spacing. However, days to emergence non-significantly affected by main and interaction effects meanwhile days to flowering and maturity, plant height, pod number per plant and straw yield were high significantly ($p < 0.01$) influenced by main effects only.

Green gram is a high-quality protein source (25%) with a good digestibility, also high in Riboflavin, Thiamine, and Vitamin C. Sprouts of green gram seeds produces significant amount of ascorbic acid (Sachan *et al*, 2023). Green gram is a rich source of protein (14.6– 33.0 g/100 g) and

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Table 1. Yield of summer moong (SML 1827) sown at different spacing.

Sr. No.	Spacing (R -R x P -P)	Yield (q/ h a)
1.	20.0 x 7.5 cm	12.35
2.	20.0 x 10 cm	12.03
3.	22.5 x 7.5 cm	12.68
4.	22.5 x 10 cm	13.05
5.	25.0 x 7.5 cm	11.90
6.	25.0 x 10 cm	11.72
7.	CD	0.43

iron (5.9–7.6 mg/100g). Green gram contains 1-3% fat, 50.4% carbohydrates, 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 (Dahiya *et al*, 2015).

Variety SML 1827 of moongbean was released during 2019 by the Punjab Agricultural University, Ludhiana is becoming popular among farmers as compared to earlier variety SML 668 due to its thin grain size and shining grains, that helps farmers to fetch better price in the market. Summer moong is grown mainly after potato/wheat crop, although it gives better yield if sown during last week of March as compared to first fortnight of April and after that. Farmers are considering it as subsidiary crop and generally go for broadcasting of the seed but that in turn reduces the yield drastically. Hence, the study was conducted to find out proper row to row and plant to plant spacing in order to get higher yields.

MATERIALS AND METHODS

The yield of summer moong depends upon different agronomic aspects such as date of sowing, spacing and fertilizer application. Out of these agronomic aspects, the spacing is one character that varies the most in the farmers' fields because of adoption of different sowing methods such as broadcasting and drill sowing etc. Taking these inputs into consideration, a study was conducted during summer 2022 on spacing of summer moong variety SML 1827. In this trial, three row to row spacing and two plant to plant spacing were taken with three replications. Row to row spacing of 20cm, 22.5cm and 25 cm were taken along with spacing of 7.5cm and 10 cm.

The experiment was conducted at the University Seed Farm, Usman, Tarn Taran by using factorial RBD design. The soil type was clay loam with pH of 7.5. The trial was sown on 4th April, 2022. The seed was treated with *rhizobium* and then sown after half an hour. Fertilizers were applied at the time of sowing at the rate of 27.5 kg/ha urea and 250 kg/ha SSP fertilizers. Weeding was done manually twice on 4th and 6th week after sowing. The crop was sown under irrigated conditions with first irrigation after 20 days and last at 60 days after sowing; with a total of 4 irrigations. Summer moong being an indeterminate crop, so harvesting was done at 80 per cent pod maturity. The yield data were recorded and analysed statistically by using Opstat online software.

RESULTS AND DISCUSSION

The data (Table 1) revealed that maximum yield was obtained under 22.5 x 10 cm spacing, which was significantly superior to all other treatments except 22.5 x 7.5 cm. It also revealed that if the row to row spacing varies from 4-5 cm to any side, result in yield loss, this confirms that broadcasting of seed will drastically reduce the yield. It has been emphasized that optimal plant density and spacing are critical for

maximizing legume productivity. Overcrowding can lead to competition for resources, while too wide spacing can result in under utilization of available resources. Proper plant spacing ensures adequate light interception, air circulation, and nutrient uptake, promoting healthy plant growth and higher yields (Saini *et al*, 2024). Likewise Msimbira and Smith (2020) showed that soil pH affects nutrient availability and microbial activity in the soil. Most legumes prefer a slightly acidic to neutral pH range (6.0-7.5). Acidic or alkaline soils can limit nutrient uptake and hinder the growth of nitrogen-fixing bacteria, reducing the plant's ability to fix atmospheric nitrogen and thus impacting productivity. In the present study, pH of the experimental plot was around 7.5 thus was suitable for legume production. Further, the study proved that properly spaced plants face less competition for essential resources like water, nutrients and sunlight. This allows each plant to access a larger share of available resources, leading to better growth, higher biomass accumulation and thus improved yield components such as pod number and seed size.

CONCLUSION

After the harvesting of wheat crop , farmers generally sow moongbean crop by following broadcasting method of sowing. This method results in uneven plant spacing whereas there is no question of row to row spacing. As a result of which farmers are not able to harvest full potential of yield as recommended by the research institutes. Therefore, this experiment clearly showed that farmers must be made aware regarding adoption of proper spacing while sowing moongbean crop in order to get maximum yield. It can be concluded that farmers should go for 22.5 x 10 cm (row to row and plant to plant spacing,) for maximizing productivity of summer moong variety SML 1827.

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