International Journal of Science, Environment and Technology, Vol. 5, No 6, 2016, 3821 – 3826

ISSN 2278-3687 (O)
2277-663X (P)

EFFECT OF VARIETIES AND DATES OF SOWING ON GROWTH PARAMETERS, YIELD ATTRIBUTES & YIELD OF BLACK GRAM (*Vigna mungo* L.)

Narinder Panotra[1], Ashwani Kumar[2] and O.P. Singh[3]

[1]Scientist; Sher-e-Kashmir University of Agricultural Sciences &Technology of Jammu, Jammu & Kashmir, India

[2]VAEA, Dept. of Agriculture, Zone Vijaypur, SAMBA (J&K), India

[3]Ex-Professor; Janta Vedic (PG) College, Baruat, U.P, India

E-mail: dr.narinderpanotra@gmail.com

Abstract: A field experiment was conducted at Agricultural Research Farm, Baruat, U.P during 2008 and 2009 to assess the performance of Black gram under different varieties (T-9, PU-19 and PU-35). These varieties were sown on different dates of sowing *viz* 5th August, 15th August and 25th August. From the result of experiment it can be concluded that, among different sowing dates in black gram, the sowing at 15th August was found optimum for achieving higher seed yield whenever the others dates of sowing. Higher plant height, more number of pods plant^{-1} and higher leaf area index were observed at all growth stages with black gram variety PU-35 was found highly productive as compared to T- 9 and PU-19. Maximum yield was recorded in variety PU-35 and date of sowing on 15th August treatments of Black gram 11.07 and 11.11 q ha^{-1}

Keywords: Black gram, Date of sowing, Yield, Economics.

INTRODUCTION

India is a major pulse growing country in the world which shares 30-35% and 27-28% of the total area and production of pulses respectively. The increase in pulses production has been only marginal and may be microscopic when compared with the phenomenal increase achieved in wheat and rice. With the rapid increase in the Indian population the availability of pulses has gone down from 30gm/capita/day during 2002 to around 26gm/capita/day at present. Pulses are important constituent of Indian diet and supply meager part of protein, essential amino acid & enrich the soil through symbiotic N fixation from atmosphere. It maintains the normal growth, development and health of mankind, as these are acting as fertilizer devices their value is increased. To fulfill our future requirement, it is must to follow the scientific production of pulses. Amongst all the factors of crop production, timely planting is important in all crops and in all seasons. Black gram and green gram crops are grown in spring summer & rainy seasons.

*Received Oct 9, 2016 * Published Dec 2, 2016 * www.ijset.net*

Black gram (*Vigna mungo* L.) belongs to family Fabaceae sub family papilionaceae, is being grown as one of the principle pulse crop. In Madhya Pradesh is occupies in area of 0.64 Mha with the production and productivity of 0.26 MT and 413 kg/ha respectively. In india black gram is a grown in 3.11 Mha area with total production of 1.90MT and average productivity is 642 kg/ha (Anonymous 2013). The most important states for pulses are Madhya Pradesh, Uttar Pradesh, Maharashtra, Andhra Pradesh, Karnataka and Bihar which together account for 80%of total production. The decreasing per capita availability of pulses from 69 g in 1961 to 37 g in 2011 in the country has been a serious concern. To alleviate protein energy malnutrition, a minimum of 50g pulses/capita/day should be available in addition to other sources of protein such as cereals, milk, meat and eggs. India grow nearly 24 million hectare pulse crops and produce nearly 15.9 million tones of pulses grain, which is still deficit of the present consumption, i.e. 17.65 million tonnes (Ali and Kumar, 2008). They also stated that At least 29.30 million tones of pulses are required by 2020.

Black gram is perfect combination of all nutrients, which includes proteins (25-26%), carbohydrates (60%), fat (1.5%), minerals, amino acids and vitamins. It stands next to soybean in its dietary protein content. It is rich in vitamin A, B1, B3 and has small amount of thiamine, riboflavin, niacin and vitamin C in it. It contains 78% to 80% nitrogen in the form of albumin and globulin. The dry seeds are good source of phosphorus. It also has very high calorie content. 100 gm of black gram has 347 calories.

Despite of these features, the productivity of crop is below the average owing to several inherent soil related constraints such as low organic matter and poor soil fertility. Hence, it requires sincere efforts to enhance its productivity. In western U. P. black gram is commonly sown in rainy season in the months of July and August depending on the rains. It is therefore, important to ascertain the exact sowing time of black gram crop with availability of rains in west U.P.

By keeping this factor in view an experiment entitled “Varietal performance of black gram (*Vigna mungo* L. Hepper) on different dates of sowing” was carried out in *Kharif* 2008 and 2009 at the Agricultural Research farm, Baraut with the objective to find out the optimum date of sowing for black gram in Baraut locality.

MATERIALS AND METHODS

An experiment was conducted at the Agricultural Research farm, Baraut, Baghpat (U.P.) 250611. Baraut is situated at the western boundary of U.P. and 57 km to the north of Delhi, the capital of India on Delhi-Sharanpur road; i.e. 20.6^0N and 77.15^0E longitude at an

elevation of 236.6 m above the sea level. This region gets average rainfall of about 651 mm extending over the period of mid July to October and few scattered showers during winter months from south-west monsoon. An average minimum and maximum temperature vary from 5^0C to 45^0C. The farm has got the tube-well and canal irrigation facilities. The soil of the experimental field was sandy loam in texture, slightly alkaline in reaction, low in organic carbon (0.35%) and available nitrogen (235 kg/ha) and was medium in available phosphorus (13.2 kg/ha) and potassium (260.2 kg/ha). The treatments comprised three black gram varieties (T-9, PU-19 and PU-35). These varieties were sown on different dates of sowing *viz* 5th August, 15th August and 25th August in randomized block design with three replications. Recommended uniform dose of N and P2O5was 20: 40 kg /ha. The entire quantity of these fertilizers was applied as basal at the time of sowing. The seeds @ 20 kg/ha were sown in lines at 30 cm row to row distance. All the recommended cultural practices were followed to raise the crop. The periodical observations on growth parameters, yield and yield attributes were recorded as per treatment. The recorded data were statistically analysed. Plant height was measured in centimeters from the base of stem to the top most leaf with the help of meter scale. The length of main pod was measured from the base of the pod up to its tip. Grain numbers produced by per pod of each tagged plant were separately counted. Grain and straw yield of each plant was weighed and recorded. All the plants from each pot were harvested, and left for sun drying. After threshing samples, grain yield per plant was recorded on average basis. To observe effect on grain filling 100 seeds from each replication were weighed separately and multiplied by 10 to obtain the test weight of seeds. The sum of the grain and straw yield per plant recorded. Harvest index were calculated by the formula suggested by Donald (1962) as follow:

$$HI(\%) = \frac{\text{Economic yield}}{\text{Biological yield}} \times 100$$

RESULTS AND DISCUSSION

Plant growth and yield attributes

A perusal of Table 1 indicates that a significant increase in growth parameters *viz* plant height, leaf area/plant and no of pods/plant was recorded at 60 DAS in variety T-9 as compared to other varieties. The crop sown on August 5 showed significantly higher plant height, leaf area/plant and no. of pods/plant than other sowing dates. Among the varieties tested PU- 35 produced significantly grain and straw yield (11.07 and 26.58 q/ha) than other

varieties viz PU-19 and T-9.Crop sown on August 15th recorded significantly higher grain and straw yield over crop sown on August 5th and August 25th.

Yield

Varieties and Planting dates significantly influenced the grain yield. Variety of black gram PU-35 produce maximum grain yield (11.07 qha^{-1}) followed by PU-19 (10.67 qha^{-1}) and minimum grain yield (10.33 qha^{-1}) was for T-9 (Table 2). The results reported by Mittal (1999) also support, as an optimum sowing date for maximum yield of the crop. Differences in production potential for different varieties are supported by Sharma *et. al* (2000) and Sing and Sing (2000). Sowing dates with black gram varieties interacted non-significantly. The highest grain yield of 11.11 qha^{-1} was recorded in sown on 15th August. Sowing before or after 15th August, decreased grain yield. The lowest grain yield (10.27 qha^{-1}) was observed in plots sown on 05th August, which was at par with yield of 25th August (10.69 qha^{-1}).

Economics

The treatment of V^3 (PU-35) and D^3 (15th August) were showed higher gross return, net return and B. C. ratio than other weed control treatments. The highest net returns of Rs 37778 /ha and Rs 38964 /ha was recorded with V^3 (PU-35) and D^3 (15th August) and the highest B. C. ratio of 2.89 and 2.95 was recorded with V^3 (PU-35) and D^3 (15th August). This show that black gram is more responsive towards the inputs use and under good management and it can give even higher returns (Table 3).

Table 1. Effect of varieties and dates of sowing on growth parameters, yield attributes & yield of black gram *{Pooled Data of Two Years}*.

Treatments	Plant height At 60 DAS (cm)	Number of branches/ Plant at 60 DAS	Leaf Area/ plant at 60 DAS (cm^2)	No of Pods/plant at 60 DAS
Varieties				
V^1- (T -9)	23.57	5.15	412.70	51.28
V^2- (PU-19)	20.94	4.18	359.75	41.83
V^3- (PU-35)	20.04	4.43	383.13	44.33
CD (P=0.05)	0.58		25.40	4.50
Dates of sowing				
D^1- 5th August	20.64	5.14	472.10	56.80
D^2- 15th August	22.67	4.34	352.08	44.92
D^3- 25th August	21.24	4.86	331.40	35.72
CD (P=0.05)	0.58	0.23	25.40	4.50

Table 2. Effect of varieties and dates of sowing on growth parameters, yield attributes & yield of black gram *{Pooled Data of Two Years}*.

Treatments	Grain Yield (q/ha)	Straw Yield (q/ha)	Biological yield (q/ha)	Harvest index (%)
Varieties				
V^1- (T -9)	10.33	25.00	35.33	41.32
V^2- (PU-19)	10.67	25.49	36.16	41.86
V^3- (PU-35)	11.07	26.58	37.65	41.65
CD (P=0.05)	0.32	0.75	1.07	
Dates of sowing				
D^1- 5th August	10.27	24.36	35.33	41.32
D^2- 15th August	11.11	26.92	37.65	41.65
D^3- 25th August	10.69	25.79	36.16	41.86
CD (P=0.05)	0.32	0.75	1.07	0.24

Table 3: Relative economics of different black gram varieties and date of sowing.

Treatments	Gross return (Rs/ha)	Cost of Cultivation (Rs/ha)	Net return (Rs/ha)	B: C ratio
Varieties				
V^1- (T -9)	47830	20012	27818	2.39
V^2- (PU-19)	51342	20012	31330	2.57
V^3- (PU-35)	57790	20012	37778	2.89
Dates of sowing				
D^1- 5th August	39968	20012	19956	2.00
D^2- 15th August	58976	20012	38964	2.95
D^3- 25th August	48675	20012	28663	2.43

REFERENCES

[1] Ali M and Kumar S. 2008. Pulse crops of India In:The Hindu Survey of Indian Agriculture. Ernaculam malyalam manorma, pp 43-46.

[2] Anonymous. 2013. Agricultural census, Directorate of economics and Statistics, Deptartment of Agriculture and Cooperation, Government of India.

[3] Mendhe, S.N., Chaudhry, C.S., Khadse, V.A., Sawaji, B.V. and Jibhak B.M. (2002). Response of urd bean to sowing dates and spacings. *J. of Soils and Crops.* **12** (2) 254- 257.

[4] Mittal, R.K., 1999. Cultural management of foliar diseases of black gram in hills of Uttar Pradesh. J. Mycol. Plant Pathol., 29: 128-130

[5] Reddy, K.S., Charalu, C.and Muralidhar, V. (1991). Effect of sowing time on yield of urd bean genotypes. *Indian J. of Pulse Research*. **4** (1) 47-49.

[6] Sharma, B.L., D.P. Singh and K.H. Singh, 2000. Evaluation of diverse germplasm lines/cultivars under different sowing dates for yield and yield components in blackgram. Indian J. Agric. Sci., 70: 154-157.

[7] Singh, D.K. and V.K. Singh, 2000. Growth and nitrogen uptake pattern of promising urdbean genotypes under different sowing dates and plant densities during rainy season. Ann. Agric. Res., 21: 456-458

[8] Thakur, H.C.; Sharma, H.M. and Rov Sharma, R.P. (1983) Performance of Black gram varieties under different dates of sowing and spacing. *Indian J. Agronomy*.**28** (2) 101- 103.