SHORT COMMUNICATION

EFFECT OF DATE OF SOWING AND WEED MANAGEMENT TECHNIQUES ON GROWTH ATTRIBUTES AND YIELD OF BLACKGRAM (*VIGNA MUNGO* L.)

Nishant Kumar Sai*, R. Tigga and V.K. Singh

IGKV, RMD College of Agriculture and Research station, Ambikapur-497001 (C.G.)India

Received-07.08.2017, Revised-20.08.2017

Abstract: An experiment was carried out to evaluate the effect of date and weed management techniques on growth and yield of blackgrama (*Vigna mungo* L.). Maximum seed yield was recorded when sowing was done on 15th July and weed management practices mechanical weeding (15 and 30 DAS and removal of weeds within rows by hand) followed by sowing on July 25th and weed management practices pendimethalin @ 0.75 a.i.ha^{-1} and mechanical weeding at 30 DAS. It was due to higher plant height, higher number of branch plant^{-1}, dry matter production.

Keywords: Blackgram, Weed management practices, Growth attributes

INTRODUCTION

Blackgram (*Vigna mungo* L.) also known as urdbean, belong to family leguminosae is one of the important pulse crop grown in many Asian countries including India, where the diet is mostly cereal based. Blackgram is rich source of protein (17 to 25 %) as compared to cereals (6 to 10 %) and, their ability to fix atmospheric nitrogen and improve the soil fertility status. Among the pulses, blackgram is extensively cultivated pulse crop. It has originated from Indian sub-continent (De candoll, 1986). Its seed contain 55-60% carbohydrate, 22-24% protein and 1.0-1.3% of fat besides, phosphoric acid (H_3PO_4), being 5-10 times more than other pulses. Black gram especially contains a higher percentage of methionine compared to other food legume. Its dry stalks along with the pod husk forms a nutritive fodder especially for cattle. In India, blackgarm is grown in 3.06 million ha area with total production of 1.70 millions tones and productivity 5.55 qt.ha^{-1} whereas Chhattisgarh it occupies 0.10 million ha area with total production of 0.03 million tones and productivity 3.04 q.ha^{-1}.

The weather parameters play an important role in deciding the success or failure of the crop, because they strongly influence strongly the physiological expression and genetic potential of the crop. It is well known that yield from any given crop or variety depends on the availability of certain optimum rainfall, solar radiation, temperature, soil moisture, heat units etc. during different stages of crop growth. Among different management factors, sowing time plays a key role in obtaining higher yield. Time of sowing is known to influence the yield and growth of black gram. The optimum time is mainly dependent on prevailing agro-climatic conditions of an area besides the crop grown. Planting during the optimum period, therefore, ensures better harmony between the plant and weather which ultimately results in higher crop yields (Venkateshwarulu and Sounda Rajan, 1991).

Sowing date has the greatest effects on the grain yield of mash bean. Delay in sowing beyond optimum date results in a progressive reduction in the potential yield of the crop. Sowing time is considered as one of the important productivity limiting factors that affect the plant growth and ultimately crop yield. Time of sowing determines time of flowering and it has great influence on dry matter accumulation, seed set and seed yield. Sowing time affects plant physiological and morphological specifications like effect on vegetative and reproductive periods, harvest time, yield and its quality. To achieve good yield, crop must be sown at appropriate time. Sowing times has makeable effects on growth and yield of most crops in different parts of the world as delay in sowing beyond the optimum time usually results in yield reduction (Vange and Obi, 2006).

The productivity of urdbean is very low in India as well as in Chhattisgarh due to various agronomic reasons, among them weed infestation is one of the major limiting factors in production, especially during rainy *(kharif)* season. Uncontrolled weeds at critical period of crop-weed competition caused a reduction of 80-90% in yield depending upon type and intensity of weed infestation. Weed species infesting urdbean vary according to the agro-ecosystem of the growing region. *Ageratum conyzoids, Boreria hispida, Commelina banghalensis* and grasses like *Echinochloa colona, Cynodon dactylon, Paspalum scrobiculatum, Digiteria sanguinalis* and sedges like *Cyperus rotundus* are the major weeds in mashbean. Most prominent weeds species observed in blackgram fields are *Panicum colona* L., *Cynodon dactylon* L., *Cyperus rotundus* L., *Digera arvensis* Forsk, *Euphorbia hirta* L., *Leucas aspera* Spreng., *Phyllanthus niruri* L., *Portulaca oleracea* L., *Indigoflora glandulosa* L., *Phyllanthus niruri* L.

*Corresponding Author

MATERIAL AND METHOD

The experiment was conducted at research cum Instructional farm of RMD College of Agriculture and Research Station, Ambikapur (C.G.) during kharif season 2016, which was located at latitude of $23^0 8'$ N, longitude of $83^0 15'$E and an altitude of 623 m mean sea level. The treatment consist of three date of sowing (15th July 2016, 25th July 2016 and 5th August 2016) as main plot and four weed management techniques (W_1: Control (weedy check), W_2: Mechanical weeding at 15 and 30 DAS and removal of weeds within rows by hand, W_3: Pendimethalin @ 0.75 lit. a. i. ha^{-1} at 0-2 DAS + Mechanical weeding at 30 DAS, W_4: Pendimethalin @ 0.75 lit. a. i. ha^{-1} at pre-emergence + Sodium acifluorfen (16.5%) + clodinafop - propargyl (8 %) EC @ 0.245 lit. a. i. ha^{-1} at 20- 25 DAS) as sub plots which were laid out in split plot design. Indira urd-1 variety was sown in 30cm X 10cm (row to row and plant to plant). Data were recorded on plant height, higher number of branch $plant^{-1}$, dry matter production, days to 50% flowering, pod weight $plant^{-1}$, number of pods $plant^{-1}$, number of seed pod^{-1}, 1000 seed weight, seed yield, biological yield and harvest index were recorded by following the standard procedures.

RESULT AND DISCUSSION

Effect of date of sowing on growth attributes

The data on plant population was significantly influenced by different date of sowing. Maximum plant population was observed under sowing date on July 15th (23.02/m^2) compared to other *i.e.* July 25th and August 5th (20.94 and 17.68/m^2) and minimum plant population was recorded under sowing on August 5. This might be due to favorable environmental condition for proper germination of crop.

The effect of different sowing times on plant height was found to be significant and the higher plant height was observed by the date of sowing *i.e.* 15th July (52.75 cm) as compared to other sowing dates. More plant height was recorded in S_1 sowing time *i.e.* 15th July this may be due to enjoying relatively more time by the plants and more rainfall during growing season. This result confirms the observations of Malik *et al*., (2003). From the data on mean number of branches, the sowing of blackgram crop in *i.e.* 15th July (6.45) found to be significantly superior over rest of all sowing times. The higher mean number of leaves (17.68) and leaf area index (806.61 cm^2) recorded by *i.e.* 15th July it was followed by the sowing at 25July and 5 August respectively. Maximum leaf area (cm^2) was produced due to long vegetative period, bright sunshine and high rainfall which favored more vegetative growth. These results agree to those of Malik *et al*., (2003). The sowing of *i.e.* 15th July recorded higher dry matter accumulation $plant^{-1}$ (58.33 g) followed by the sowing at 25th July and August 5th. Higher total dry matter accumulation $plant^{-1}$ was due to more cell elongation and vigorous growth of the crop plant due to the more rainfall and bright sunshine. The similar trend in case of growth characters was reported by Antony *et al.*, (2006). Maximum days to 50% flowering were observed with the date of sowing July 15th (38.58) as compare to other date of sowing. Delay in sowing resulted early flowering and early maturity.

Effect of weed management techniques on crop growth attributes

The growth characters like plant height, number of branch $plant^{-1}$, number of leaves $plant^{-1}$ and dry matter production $plant^{-1}$(g) were positively and significantly increased by various weed management treatments (Table 1). Mechanical weeding at 15 and 30 DAS and removal of weeds within rows by hand recorded taller plants (36.69 cm) and more dry matter production $plant^{-1}$ (52.01 g $plant^{-1}$) followed by pendimethalin @ 0.75 lit. a. i. ha^{-1} at 0-2 DAS + Mechanical weeding at 30 DAS and pendimethalin @ 0.75 lit. a. i. ha^{-1} at pre-emergence + Sodium acifluorfen (16.5%) + clodinafop- propargyl (8 %) EC @ 0.245 lit. a. i. ha^{-1} at 20- 25 DAS. The increased in plant height, number of branch $plant^{-1}$, number of leaves $plant^{-1}$ and dry matter accumulation $plant^{-1}$ might be due to the less crop-weed competition for different growth factor resulted proper utilization of solar radiation, water, nutrients, etc. where as in control plot because of more crop-weed competition, plants unable to obtain water, nutrients and solar radiation in sufficient quantity resulted lowest height. Similar results have been reported by Rao *et al*. (2010).

Table 1. Effect of date of sowing and weed management techniques on growth characters of blackgram

Treatment	Plant population	Plant height (cm)	No. of branch $plant^{-1}$	No. of leaves $plant^{-1}$	LAI (cm^2)	Dry matter accumulation $Plant^{-1}$ (g)	Days to 50% flowering	Seed yield (q ha^{-1})
Date of sowing								
S_1: 15 July, 2016	23.02	52.75	6.45	17.68	806.61	58.33	38.58	10.68
S_2:25 July, 2016	20.94	46.80	5.55	15.72	762.16	41.97	34.33	8.93
S_3: 05 Aug., 2016	17.68	42.45	4.59	8.30	740.17	33.07	30.42	6.37
SEm±	**0.59**	**1.07**	**0.12**	**0.46**	**9.14**	**0.84**	**0.25**	**0.33**
CD(P=0.05)	**2.33**	**4.20**	**0.48**	**1.80**	**35.92**	**3.33**	**1.00**	**1.31**
Weed management								
W_1	20.20	45.13	5.33	11.93	767.23	32.43	34.22	6.23

W_2	21.87	48.58	5.75	16.40	772.72	52.01	34.56	10.25
W_3	20.10	47.84	5.60	13.76	770.04	46.76	34.55	9.27
W_4	20.02	47.78	5.45	13.50	768.59	46.61	34.44	8.89
SEm±	**0.37**	**0.78**	**0.08**	**0.74**	**0.80**	**0.88**	**0.20**	**0.33**
CD(P=0.05)	**1.11**	**2.32**	**0.26**	**2.19**	**2.38**	**2.62**	**0.60**	**0.97**

CONCLUSION

The date of sowing of July 15th and July 25th were found beneficial as compared to other date of sowing. Among the different weed management techniques mechanical weeding (15 and 30 DAS) was found more profitable.

REFERENCES

Antony, E., Chowdhury, S. R. and Kar, G. (2006). Variations in heat and radiation use efficiency of green gram as influenced by sowing dates and chemical sprays, J. Agromet, 2003, **5**(2): 58-61.

Decandolle, A. P. (1986). Origin of cultivated plants. Hafnor publishing, NEWYORK (USA).

Malik M. A., Saleem, M. F., Ali, A. and Rana, A. F. (2003). Effect of sowing dates and planting patterns on growth and yield of mung bean (*Vigna radiata* L. Wilczek), J. Agri. Res. 44(2).

Rao, A.S., Subba Rao, G. and Ratnam, M. (2010). Copies bio-efficacy of sand mix application of pre mergence herbicides alone and in sequence with imazethapyr on weed control in relay crop of blackgram. Pak. J. Weed Sci. Res., **16**(3): 279-285.

Vange, T., Obi, IU. (2006). Effect of planting date on some agronomic traits and grain yield of upland rice varieties at Makurdi, Benue State, Nigeria. Journal of Sustainable Development and Agricultural Environment **2,** 1-9.

Venkateshwarulu, M. S. and Soundara Rajan, M. S. (1991). Influence of season on growth and yield attributes of blackgram. Indian journal of Agronomy., 36: 199-123.