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## Weather effects on growth parameters of blackgram cultivars under different sowing dates during *rabi* in North Western Plateau zone of Odisha

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**Abstract**

A Field experiment was carried out during *rabi* 2018-2020 at RRTTSS, Kirei, Sundargarh district of Odisha to assess "Weather effects on growth parameters of blackgram cultivars under different sowing dates in North Western Plateau zone of Odisha". Three varieties (PU31, IPU 0243 and OBG41) were sown at spacing of 30 x 10 cm<sup>2</sup> under five sowing dates *viz.*, 8<sup>th</sup> November' 19, 23<sup>rd</sup> November' 19, 8<sup>th</sup> December' 19, 23<sup>rd</sup> December' 19 and 7<sup>th</sup> January' 20. The experiment was laid out in FRBD with fifteen treatments and three replications. The treatment D<sub>1</sub>V<sub>1</sub> (8<sup>th</sup> November and variety PU-31) was found significantly superior with respect to plant growth parameters over all other treatments. It was observed that when all varieties were sown on first date (8<sup>th</sup> November), highest growth was obtained whereas least growth was attained when sown on fourth date (23<sup>rd</sup> December).

**Keywords:** growth, FRBD

**1. Introduction**

In India, the total area, production and productivity of blackgram is about 5279 ha, 2430 tonnes and 1430 kg/ha, whereas in Odisha, crop is sown in an area of about 72.5 thousand ha with production of 23.7 thousand tonnes and 327 kg/ha.

Among pulses, Blackgram (*Vigna mungo* L.) which is commonly known as urbean is grown as principle pulse crop in India. In the Northern parts where winter is more severe, it is cultivated as Kharif crop, whereas in Eastern states it is cultivated as *Rabi* season crop and in Southern states it is grown during both seasons.

Weather parameters plays very important role in deciding the success or failure of crop. This is because they strongly influence the physiological expression and genetic potential of crop. Winter crops are peculiarly vulnerable to high temperature during maturity and shows differential responses to changes in temperature under different environments.

In Sundargarh district, black gram is usually sown in rainy season depending on precipitation. It is therefore, important to ascertain the exact sowing time of black gram crop with availability of rains in this district. By keeping this factor in view an experiment entitled "Weather effects on growth parameters of Blackgram cultivars under different sowing dates during *rabi* in North Western Plateau zone of Odisha" was carried out during *rabi* season at RRTTSS, Kirei, Sundargarh district of Odisha with the following objectives:

1. To standardize the optimum sowing window and suitable variety in *rabi* blackgram.
2. To study the effect of date of sowing and varieties on growth of blackgram.

**2. Materials and Methods****2.1. Weather during the Crop Period**

The weekly maximum temperature during the crop growth period ranged from 23.4 °C to 30.7 °C with an average of 27.6 °C. The weekly minimum temperature during the crop period ranged from 15.6 °C to 9.1 °C, with an average of 12 °C. The weekly RH-I and RH-II was recorded to be 68% and 44%, respectively. The weekly wind velocity, BSH and evaporation during the crop growth period was recorded to be 15.9 km/hour, 5 hours/day and 2.9 mm respectively.

**2.2. Experimental Details**

The Experiment was laid out in Factorial Randomized Block Design with fifteen treatments and three replications. The gross and net plot size was 4.80 x 3.40 m<sup>2</sup> and 4.20 x 3 m<sup>2</sup>,

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respectively. Three varieties (PU 31, IPU 0243, OBG 41) i.e., V<sub>1</sub>, V<sub>2</sub>, V<sub>3</sub>, respectively were sown by dibbling method on five sowing dates (8<sup>th</sup> November, 23<sup>rd</sup> November, 8<sup>th</sup> December, 23<sup>rd</sup> December and 7<sup>th</sup> January (i.e., D<sub>1</sub>, D<sub>2</sub>, D<sub>3</sub>, D<sub>4</sub> and D<sub>5</sub> respectively) with 30 x 10 cm<sup>2</sup> spacing's.

### 3. Results and Discussions

#### 3.1 Effect of sowing dates and varieties on growth parameters

The effect of sowing dates and varieties on growth parameters was found to be significant is given in Table 1. D<sub>1</sub> (8<sup>th</sup> November) and V<sub>1</sub> (PU-31) produced significantly highest plant height i.e. 42.6 cm and 38.6 cm, respectively. This might be due to early sowing of crop leads to increase in accumulation of more photosynthates due to presence of high temperatures during that period. The number of functional

leaves plant<sup>-1</sup> increased continuously up to 60 DAS, thereafter it decreased due to crop senescence. The crop sown on D<sub>1</sub> (8<sup>th</sup> November) and variety (PU-31) produced maximum numbers of functional leaves/plant, i.e. 27 and 22.5, respectively. The rate of increase of branches/plant was recorded more between 30 to 45 DAS. Highest number of branches plant<sup>-1</sup> (6.8) was recorded when sown on D<sub>1</sub> (8<sup>th</sup> November) by (PU-31) (6.4). Maximum leaf area index (LAI) values observed in D<sub>1</sub> (8<sup>th</sup> November) i.e. 1.61 by variety (PU-31) (1.46). This may be due to higher number of leaves and ultimately more leaf area that resulted in increased transfer of photosynthates to sink. Highest dry matter accumulation was recorded in D<sub>1</sub> (8<sup>th</sup> November) i.e. 23.3g/plant by variety PU-31 (20.3 g/plant) due to favourable weather condition during crop growing period.

**Table 1:** Different growth parameters of blackgram as influenced by different dates of sowing and varieties

Treatment	Plant height (cm)	No. of functional leaves/plant	No. of branches/plant	Lai	Dry matter (g/plant)
<b>Sowing dates (d)</b>					
D <sub>1</sub>	42.6	27	6.8	1.61	23.3
D <sub>2</sub>	40.7	23.9	6.6	1.52	20.7
D <sub>3</sub>	32	17.2	5.9	1.31	15.9
D <sub>4</sub>	31.1	16.5	5.7	1.3	15.8
D <sub>5</sub>	39.2	21.9	6.5	1.47	20.4
SEM+-	0.40	0.56	0.06	0.007	0.254
Cd(p=0.05)	1.53	1.63	0.17	0.021	0.737
<b>Varieties (v)</b>					
V <sub>1</sub>	38.6	22.5	6.4	1.46	20.3
V <sub>2</sub>	35.3	19.9	6.1	1.42	18.2
V <sub>3</sub>	37.5	21.5	6.3	1.44	19.2
SEM+-	0.52	0.43	0.04	0.005	0.197
Cd(p=0.05)	1.18	1.26	0.13	0.016	0.571
<b>Interaction (dxv)</b>					
SEM+-	0.91	0.97	0.10	0.013	0.441
Cd(p=0.05)	Ns	Ns	Ns	Ns	Ns

#### 4. Conclusion

On the basis of the field experimentation on Weather effects on growth and yield of blackgram cultivars under different growing environment during *rabi* in North Western Plateau zone of Odisha, it could be concluded that.

1. Among different sowing dates in *rabi* black gram, the sowing at D<sub>1</sub> (8<sup>th</sup> November) was considered best for sowing *rabi* blackgram and produced higher returns.
2. The black gram variety PU31 recorded with the highest yield over other two varieties, i.e., OBG41 and IPU 0243 during the investigation.
3. The treatment D<sub>1</sub>V<sub>1</sub> (8<sup>th</sup> Nov'19 and PU31) performance was considered best with respect to growth whereas least performance was observed from treatment D<sub>4</sub>V<sub>2</sub>.

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