

## To Study the Performance of Urdbean Varieties for Yield Attributes and Yield under Rainfed Condition

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### ABSTRACT

The field investigation entitled “To study the performance of urdbean varieties for yield attributes and yield under rainfed condition” was conducted at Research Farm, J.N.K.V.V., College of Agriculture, Tikamgarh (M.P.) during Kharif 2016. The experiment was laid out in randomized block design with three replications. The field experiment was conducted with 10 different urdbean varieties viz. JU-3, IPU 94-1, LBG 20, PU 30, PU 31, JU 86, NUL-7, PU 35, KU 96-3, Azad urd-1. Gross and net plot size viz., 4 m x 3.6 m and 3 m x 2.4 m, respectively. The soil was medium black, clayey loam in texture, alkaline in reaction and higher in total soluble salt concentration, low in nitrogen and rich in phosphorus, potassium and lime, alkaline in reaction with high base saturation. Sowing was done by manually. The seed was placed at 4-5 cm depth manually in furrows 30 cm apart drawn by manual labour with help of kudal. From the result of experiment it can be concluded that, among different varieties in urdbean, The number of pods plant<sup>-1</sup>, numbers of seeds pod<sup>-1</sup>, pod length and test weight (g) were recorded significantly higher under PU-31 and found the lowest in cv. NUL-7. The seed yield and biological yield (kg ha<sup>-1</sup>) was recorded significantly higher with cv. PU-31. The significantly lowest yield was recorded in NUL-7. The urdbean variety PU-31 was found highly productive as compared to LBG-20 and NUL-7.

**Key words:** Urdbean, Relative performance, Different varieties, Yield attributes

### INTRODUCTION

Urdbean (*Vigna mungo* L.), is one of the important pulse crop, grown throughout the country. The crop is resistant to adverse climatic conditions and it improves the soil fertility by fixing atmospheric nitrogen in the soil. In India, urdbean grown in 3.06 million

ha area with total production of 1.70 million tones and average productivity is 555 kg ha<sup>-1</sup>. In Madhya Pradesh, it occupies an area of 0.60 million ha with the production and productivity of 0.23 million tonnes and 376 kg ha<sup>-1</sup>, respectively.

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In Tikamgarh district, urdbean is grown in 84.50 thousand hectare area with annual production of 60.07 thousand tones and average productivity of 711 kg ha<sup>-1</sup>. The most important pulses growing states 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 problem. 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 grows nearly 24 million hectare pulse crops and produce nearly 15.9 million tone of pulse grain, which is still deficit of the present consumption, i.e. 17.65 million tonnes<sup>1</sup>. They also stated that at least 29.30 million tone of pulses are required by 2020. Urdbean 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. 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 g of urdbean has 347 calories. Urdbean thrives well under drought prone condition. However, there is a great variability for drought tolerance among urdbean genotypes under drought condition.

#### MATERIAL AND METHODS

A field experiment was undertaken at research Farm, J.N.K.V.V., College of Agriculture, Tikamgarh (M.P.) during *Kharif* 2016 to study the “To study the performance of urdbean varieties for yield attributes and yield under rainfed condition”. The soil of experimental plot was clayey loam in texture, medium in organic carbon (0.62 %), poor in nitrogen (233 kg ha<sup>-1</sup>), poor in available phosphorus (16.7 kg ha<sup>-1</sup>), high in potash (497 kg ha<sup>-1</sup>) and (pH 7.2). The experiment was laid out in

randomized block design with three replications. The field experiment was conducted with 10 different urdbean varieties *viz.* JU-3, IPU 94-1, LBG-20, PU-30, PU-31, JU 86, NUL-7, PU 35, KU 96-3, Azad urd-1. The urdbean varieties were sown on 14<sup>th</sup> July, 2016. The recommended seed rate 25 kg ha<sup>-1</sup> was used to maintain the optimum plant population of urdbean varieties. Before sowing, seeds were first treated with a fungicide “Thirum” @ 3 g kg<sup>-1</sup> seed and then inoculated with *Rhizobium* culture @ 10 g kg<sup>-1</sup> seed, just before sowing. The seed was placed at 4-5 cm depth manually in furrows 30 cm apart drawn by manual labour with help of *kudali* after fertilizer application and rows were covered with soil immediately after seeding. The growth observations were recorded at 15, 30, 45, 60 DAS and at harvest whereas the yield attributing and yield observations were recorded at harvest.

#### RESULTS

**Effect of varieties on yield attributes and yield:** The performance of variety PU-31 as regard to yield attributing characters *viz.*, number of pods plant<sup>-1</sup>, number of seeds pod<sup>-1</sup>, pod length and test weight (g) was significantly superior as compared to LBG-20 and NUL-7. The probable reason for this may be the genetic makeup of the variety that has helped in improving the photosynthetic activity due to increased source capacity and efficient translocation of photosynthates to the sink (seed). Patra *et. al.*<sup>8</sup>, observed improvement in urdbean varieties having different genetic makeup. Pod formation started 50 DAS, and development of pod was continued up to maturity. Genotype PU-31 produced significantly more number of pods per plant and seed yield per plant as compared to LBG-20 and NUL-7 indicating its higher yield potential. Similar trends were reported by Rao *et. al.*<sup>9</sup>, The performance of urdbean varieties in respect of seed yield was very encouraging and followed a similar trend that of yield attributes. The urdbean variety PU-31 recorded higher seed yield of (980 kg ha<sup>-1</sup>) which was significantly superior over varieties

LBG-20 and NUL-7. This increase in seed yield of PU-31 genotype might be due to the higher production efficiency that has been reflected through improvement indifferent yield attributing characters. Similar findings were reported by Patra *et. al.*<sup>8</sup>, Urdbean genotype PU-31 produced biological yield of (4398 kg ha<sup>-1</sup>) which was found significantly superior over NUL-7 and found at par with variety LBG-20. The higher biological yield of PU-31 as compared to NUL-7 might be due to accumulation of more dry matter and higher biomass potential. These findings are in

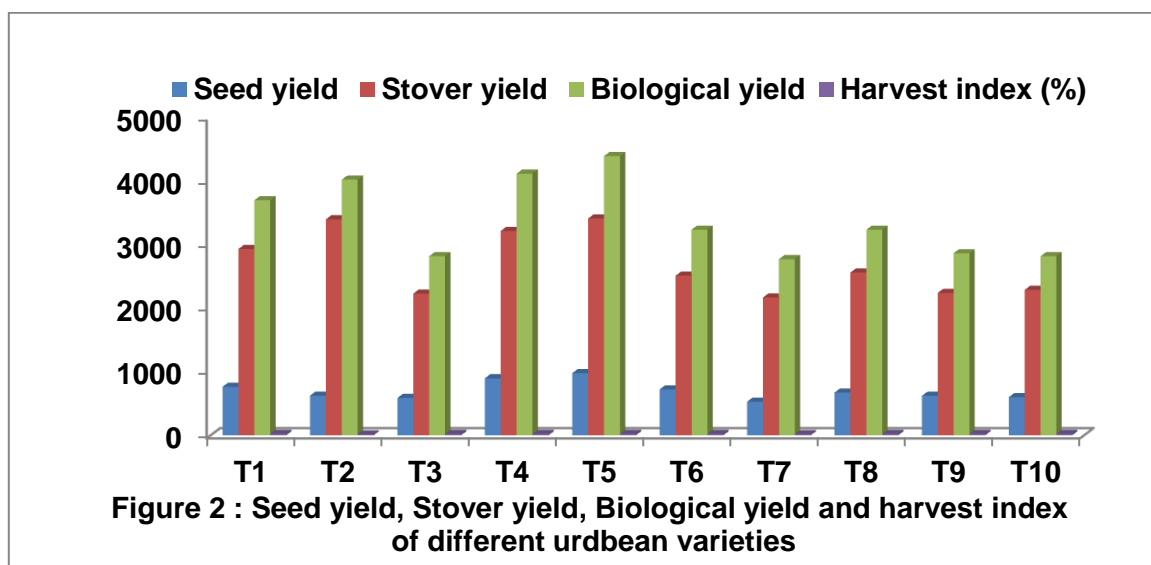
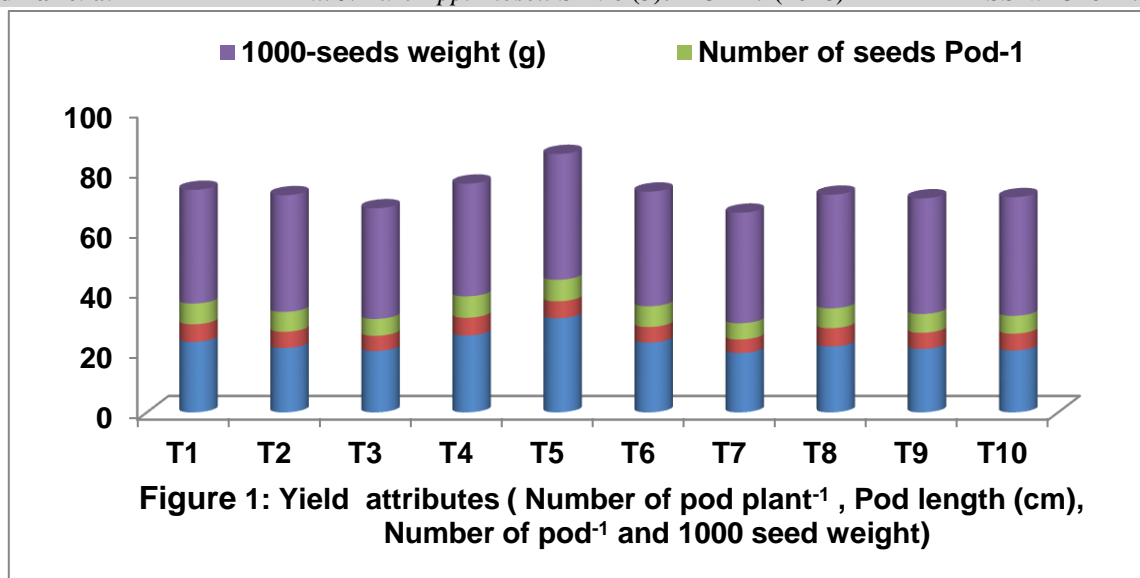
conformity with the findings of Choudhary *et. al.*<sup>4</sup>, Urdbean varieties differed significantly in harvest index. The genotype PU-31 recorded higher harvest index as compared to LBG-20 and NUL-7 which might be due to its higher production efficiency similar trend was observed by Kandasamy and Kuppasamy<sup>6</sup>. Such variations in yield and yield attributes among the urdbean varieties have also been observed by several research workers, Santella *et. al.*<sup>10</sup>, Mahalakshmi *et. al.*<sup>7</sup>, Gupta *et. al.*<sup>5</sup>, Bhowmick *et. al.*<sup>3</sup>, Bhowland and Bhowmik<sup>2</sup>, SwarupIndu and Holkar<sup>11</sup>.

**Table 1: Effect of different urdbean varieties on yield attributes**

Treatment Number	Varieties	Number of pods Plant <sup>-1</sup>	Length of pod (cm)	Number of seeds (Pod <sup>-1</sup> )	1000-Seeds Weight (g)
T <sub>1</sub>	JU-3	23.40	5.86	6.90	37.67
T <sub>2</sub>	IPU-94-1	21.40	5.39	6.60	38.67
T <sub>3</sub>	LBG-20	20.40	5.05	5.60	36.67
T <sub>4</sub>	PU-30	25.53	5.91	7.10	37.33
T <sub>5</sub>	PU-31	31.27	5.63	7.13	41.67
T <sub>6</sub>	JU-86	23.20	5.17	6.87	38.00
T <sub>7</sub>	NUL-7	19.73	4.50	5.37	36.67
T <sub>8</sub>	PU-35	21.87	6.11	6.57	37.67
T <sub>9</sub>	KU-96-3	21.07	5.38	6.23	38.33
T <sub>10</sub>	Azad urd-1	20.53	5.64	5.90	39.33
SEm+		<b>0.62</b>	<b>0.17</b>	<b>0.28</b>	<b>0.28</b>
CD ( P= 0.05)		<b>1.90</b>	<b>0.51</b>	<b>0.85</b>	<b>0.85</b>

**Table 2: Effect of different urdbean varieties on seed yield, Stover yield, biological yield and harvest index**

Treatment Number	Varieties	Seed Yield (Kg ha <sup>-1</sup> )	Stover Yield (Kg ha <sup>-1</sup> )	Biological Yield (Kg ha <sup>-1</sup> )	Harvest Index (%)
T <sub>1</sub>	JU-3	765	2938	3703	20.65
T <sub>2</sub>	IPU-94-1	625	3403	4027	15.51
T <sub>3</sub>	LBG-20	589	2235	2824	20.86
T <sub>4</sub>	PU-30	899	3221	4120	21.83
T <sub>5</sub>	PU-31	980	3417	4398	22.29
T <sub>6</sub>	JU-86	724	2517	3240	22.33
T <sub>7</sub>	NUL-7	530	2174	2777	19.09
T <sub>8</sub>	PU-35	674	2567	3240	20.79
T <sub>9</sub>	KU-96-3	623	2247	2870	21.70
T <sub>10</sub>	Azad urd-1	603	2294	2824	21.34
SEm+		<b>20</b>	<b>413</b>	<b>409</b>	<b>2.40</b>
CD ( P= 0.05)		<b>60</b>	<b>1269</b>	<b>1258</b>	<b>N.S.</b>



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