



# Performance of Pratap Urd 1 Variety of Blackgram in Agro-Climatic Zone-V of Rajasthan

K C Meena and Lokesh Kumar Meena

College of Agriculture, Ummedganj, Kota (Rajasthan)

## ABSTRACT

The present study has been conducted to assess the actual spreading of new variety of Black gram in terms of area, production and productivity in comparison to existing varieties. The Pratap Urd1 (KPU 07-08) is a high yielding cultivar of blackgram. It was released from Agriculture Research Station, Kota for rainfed conditions of Rajasthan and notified in the year 2013. The area under blackgram in the agro-climatic zone v was increased from 0.065 mha in *kharif* 2014 to 0.439 mha in *kharif* 2017 and the decreasing trend was observed during *kharif* 2018 (0.391 mha). The same trend was found in the production and productivity of black gram crop. The annual growth rate of black gram productivity in Kota zone and Rajasthan were worked out as -0.34, 0.50, 0.07 and -0.28 per cent as against of -0.30, 0.66, -0.02 and 0.58 per cent in Rajasthan during the year of 2015, 2016, 2017 and 2018, respectively. The area under improved variety pratap urd1 continuously increased from 10 ha to 38175 ha in *kharif* 2014 to 2018. The study clearly indicated that the Pratap urd1 variety was cultivated on 9.74% area (*kharif* 2018) of the total black gram area in Kota zone of Rajasthan. The characteristic of Pratap urd1 which scored highest among producers was tolerance to yellow mosaic virus, reported by 89.16% of producers depending on the variety and assigned I<sup>st</sup> rank in their choice.

**Key Words:** Adoption, Black gram, Farmers, Pratap-urd 1 and Production trend.

## INTRODUCTION

The productivity of pulses in India continues to be quite low (622 kg/ha) on account of several biotic and abiotic stresses besides unavailability of quality seeds of improved varieties in time and poor crop management due to unawareness and non-adoption of recommended production and plant protection technologies. India is the world's largest producer as well as consumer of black gram. It produces about 1.5 to 1.9 million tons of black gram annually from about 3.5 mha of area, with average productivity of 500kg/ha. Blackgram crop is also gaining momentum since 2015-16 and there has been a phenomenal increase in its coverage. During 2017-18 the crop was cultivated over an area of more than 50 Lakh ha. More than 90 percent of blackgram production comes from nine states of Madhya Pradesh, Rajasthan, Uttar Pradesh, Andhra

Pradesh, Tamil Nadu, Maharashtra, Jharkhand, Gujarat and West Bengal (Chand and Kumar, 2017 and Roy *et al*, 2017).

The variety is the pivot around which the entire production system revolves. Therefore, scientific black gram cultivation must start with the selection of appropriate variety for the agro-climatic zone, soil type and season concerned. New varieties are continuously evolved by the research system all over India. The outcome of this research in kind of new black gram variety capable of producing economic importance and help to improve the economic conditions of black gram growers. The Pratap Urd1 (KPU 07-08) is a high yielding cultivar having seed yield potential of 9-10 q/ha, matures in 72-78 d, moderately resistant against MYMV, leaf crinkle, web blight, and powdery mildew and resistant to anthracnose & bacterial leaf spot diseases. This

Corresponding Author's Email: kamalkvkanta@gmail.com

\*Assistant Professor (Extension Education), College of Agriculture, Ummedganj, Kota (Raj.)

\*\*Assistant Professor (Agriculture Economics), College of Agriculture, Ummedganj, Kota (Raj.)

variety is semi-spreading, determinate growth habit, the ovate shape of the terminal leaflet, hairy and long pods having 6-9 seeds/pod and bold seed size (4.5g/100 seed). It is also tolerant to stem fly and whitefly.

The spread of the newer varieties replacing the older varieties need to be closely monitored to take advantage of the superior characters of these newer varieties released by various research Institutions. This will help to break the yield plateau that has been experiencing in pulses crops in the recent past and to increase the production and productivity of the crop. Though many steps are being taken by the Government to popularize these varieties like Frontline Demonstration, mini kit supply, organizing training programmes for farmers, farm women, seed growers, seed production personnel of public and private seed agencies, extension functionaries of state departments of agriculture, officials of state agricultural universities and NGOs, there is no concrete data to prove that the newer variety of black gram are spreading faster and replacing the older ones. However, there has been no systematic monitoring of the adoption of these varieties, and economic impacts on producers were not evaluated. The majority (64 %) of farmers adopted improved chickpea varieties (Nain *et al.* 2014). Key socio-economic research questions remain unanswered; especially whether this improved variety has effectively contributed to achieving their intended impacts. Therefore, the present study has been conducted to assess the actual spreading of this new variety in terms of area, production, productivity and total income generated in comparison to existing varieties. This study was aimed to analysis the determinants of varietal uptake and the socio-economic impact of this variety on black gram growers with the objective to document the trends of black gram production and the extent of adoption of improved blackgram variety Pratap urd1 in the agro-climatic zone-v of Rajasthan.

## MATERIALS AND METHODS

The Present investigation was conducted in agro-

climatic zone v of Rajasthan. The study was based on both secondary and primary data. Secondary data relating to the area, production and productivity of black gram were collected from government publications and web sites to arrive at the trends in the area, production, and productivity. The approach used for this investigation was to gather information from both adopted and non adopted farmers so that the impact of variety can be measured by comparing with and without technology. A survey was carried out in all four districts of the Kota zone in Rajasthan during April-May 2019. An exploratory survey was conducted by a team of researchers along with local partners to acquire a broad overview of the adoption process and pattern in the area. The data were collected through personal contacts with the help of a well-structured interview schedule. The team tested the instruments with the farmers and adjusted the interview schedule based on the lesson learned from field testing. The structured interview schedule/questionnaire used for the survey was designed to generate information on socio-economic characteristics of farmers, farmers' preference towards the traits of the variety, crop input, crop outputs, production costs, gross and net return.

The multistage stratified random sampling was used to select the respondents. Each district area was classified into different strata based upon estimated adoption levels observed during the exploratory survey. The proportion of each of the selected district's black gram area to the total black gram area of the entire selected region was considered as a criterion to decide the number of villages and sample sizes from each district. The villages from each block/strata were randomly selected to ensure the representativeness of the sample concerning landholding size, crop yield, etc. After a discussion with key informants in the selected village, 5blackgram growing households were selected from each village for collecting the required and relevant information. The sampling framework for the collection of primary data is shown in Table 1. The gathered data were processed, tabulated,

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**Table 1. Sampling framework for the collection of primary data of black gram.**

District	Blackgram Area ('000ha)	No. of Strata/Block	No. of villages	Households sample		
				Adopting	Non-adopting	Total
Kota	99	2	5	30	15	45
Bundi	139	2	7	40	20	60
Baran	104	2	5	30	15	45
Jhalawar	50	2	3	20	10	30
Total	392	8	20	120	60	180

classified and analyzed in terms of suitable statistics in the light of objectives of the study.

## RESULTS AND DISCUSSION

### Production trend

The data (Table 2) indicated that the share of the area in Kota zone to the area of Rajasthan was increased from 32.33 to 52.26 percent during the year 2014 to 2018. The area under black gram in the agro-climatic zone v was increased from 0.065 mha in *Kharif* 2014 to 0.439 mha in *Kharif* 2017 and the decreasing trend was observed during *Kharif* 2018 (0.392 mha). The same trend was found in the production and share of the Kota zone to the production in Rajasthan was increased from 42.19 to 63.21 percent from *Kharif* 2014 to *Kharif* 2017 and also decreased during *Kharif* 2018 (28.55%). The production of black gram in the zone was increased from 0.047 MT in *Kharif* 2014 to 0.330

MT in *Kharif* 2017 and decreased during the year 2018 (0.211MT). The productivity of black gram in the Kota zone was higher as compared to Rajasthan state during the year 2014 to 2017 and low (539kg/ha) as compared to Rajasthan (988kg/ha) during the year 2018. The similar observations were recorded Rimal *et al* (2014) in the chickpea production.

### Growth Rate

The annual growth rates of black gram area in the Kota zone and its comparison to Rajasthan were worked out. Table 3 depicted that the percent growth rate of black gram area of the Kota region was 0.87, 0.82, 0.96 and -0.10 percent as against 0.48, 0.59, 0.76 and -0.10percent in Rajasthan during the year of 2015, 2016, 2017 and 2018, respectively. The annual growth rates of black gram production in the Kota zone and its comparison to Rajasthan were also worked out as 0.06, 2.16, 1.08 and -0.36 percent as against 0.01, 1.67, 0.71 and 0.41percent

**Table 2. Trend in area, production, and yield of blackgram in Kota zone of Rajasthan.**

Year	Kota zone			Share of Kota zone in Rajasthan		Rajasthan		
	Area (Mha)	Production (MT)	Yield (Kg/ha)	Area (%)	Production (%)	Area (Mha)	Production (MT)	Yield (Kg/ha)
2014	0.065	0.047	720	32.33	42.19	0.201	0.112	556
2015	0.122	0.050	471	40.93	44.21	0.298	0.114	384
2016	0.223	0.158	708	46.84	51.91	0.476	0.305	641
2017	0.439	0.330	758	52.32	63.21	0.839	0.523	624
2018*	0.392	0.211	539	52.26	28.55	0.750	0.741	988

Source:- Source:-[www.krishi.rajasthan.gov.in](http://www.krishi.rajasthan.gov.in) \*Joint Director(Agriculture)Kota,Raj., (Mha=Million hectare, MT=Million Tons)

**Table 3. Growth rate of blackgram area, production, and yield in Kota zone of Rajasthan.**

Year	Area (%)		Production (%)		Yield (%)	
	Kota zone	Rajasthan	Kota zone	Rajasthan	Kota zone	Rajasthan
2014	-	-	-	-	-	-
2015	0.87	0.48	0.06	0.01	-0.34	-0.30
2016	0.82	0.59	2.16	1.67	0.50	0.66
2017	0.96	0.76	1.08	0.71	0.07	-0.02
2018	-0.10	-0.10	-0.36	0.41	-0.28	0.58

in Rajasthan during the year of 2015, 2016, 2017 and 2018, respectively. The annual growth rate of black gram productivity in the Kota zone and Rajasthan were worked out as -0.34, 0.50, 0.07 and -0.28 percent as against -0.30, 0.66, -0.02 and 0.58 percent in Rajasthan during the year of 2015, 2016, 2017 and 2018, respectively. It might be due to the fact that the rainfall and weather conditions at the time pod formation and maturity stage of black gram crop.

#### Adoption of blackgram

The estimated data regarding the horizontal spread of improved variety Pratap urd1 in the agro-climatic zone v of Rajasthan is presented in table 4. It was observed that the area under improved variety Pratap urd1 was estimated only 10ha during the year 2014 which was horizontally spread out and estimated 52ha in *Kharif* 2015, 490ha (2016), 5120ha (2017) and 38175ha (2018) respectively. It was shown that the horizontal spread of Pratap urd1 was from about 52 ha during 2015 to 38175ha during the year 2018. The Pratap urd1 variety of black gram was introduced during the year *kharif* 2014 in the Kota region and shares only 0.01 percent area of total black gram cultivated area. In aggregate, the Pratap urd1 was cultivated on 0.04% (2015), 0.22% (2016), 1.17% (2017) and 9.74% (2018) of total area of black gram, respectively. The study clearly indicated that the Pratap urd1 variety was cultivated on 9.74 Percent of the total black gram area in the Kota zone of Rajasthan within five years of its introduction in this agro-climatic zone.

It was low adoption due to unavailability of Pratap urd1 seed in the area but it was superior in terms of productivity, bold seeded, early maturity and tolerance to MYMV and fetches good marketing value as compared to T9, Krishna and existing old varieties in the zone. These results were in line with the findings of Rimal *et al* (2014) and Mazid *et al* (2009).

#### Reasons for adoption by adopting farmers

Producers' preferences for certain characteristics are critical for variety adoption. Therefore, understanding the criteria used by producers to evaluate new crop varieties allows breeders to effectively set priorities and target different breeding strategies to different communities. Producers' evaluations of new varieties are also useful to determine whether they have maintained their intrinsic characteristics and if their agronomic, as well as quality and price performances, are satisfactory from the view of the end-users. The characteristic which scored highest among producers was tolerance to yellow mosaic virus, reported by 89.16 percent of producers depending on the variety and assigned 1st rank in their choice (Table 7). Other characteristics also scored highly among producers was short duration (85.83%), better in yield (84.66%), bold seeded (77.50%), good in market prices (75.00%) and less insect attack due to hairy pods (72.50%) respectively and assigned II<sup>nd</sup>, III<sup>rd</sup>, IV<sup>th</sup>, V<sup>th</sup> and VI<sup>th</sup> rank respectively. The similar results were also reported by Mazid *et al* (2009) in adoption of wheat varieties.

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**Table 4. Characteristics of Pratap urd 1 variety preferred by adopting farmers.**

Trait	No. of black gram grower	% of black gram grower	Rank
Tolerance to MYMV	107	89.16	I
Matures in 72-78 day	103	85.83	II
Better in yield	101	84.66	III
Bold seeded	93	77.50	IV
Good in the market price	90	75.00	V
Less insect due to hairy pods	87	72.50	VI

### CONCLUSION

The study revealed that the productivity of black gram in the Kota zone was higher as compared to Rajasthan state during the year 2014 to 2017 and estimated low as compared to Rajasthan during the year 2018. The area under black gram in the agro-climatic zone v was increased from 0.065 mha in *kharif* 2014 to 0.439 mha in *kharif* 2017 and the decreasing trend was observed during *kharif* 2018 (0.392 mha). The area under improved variety Pratap urd-1 continuously increased from 10 ha to 38175 ha from the year *kharif* 2014 to 2018. The study clearly indicated that the Pratap urd1 variety was cultivated on a 9.74 percent area (*kharif* 2018) of the total black gram area in the Kota zone of Rajasthan. The characteristic which scored highest among producers was tolerance to yellow mosaic virus, reported by 89.16 per cent of producers depending on the variety and assigned 1<sup>st</sup> rank in their choice.

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