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COLLECTION AND EVALUATION OF PROMISING VARIETIES TO SELECT HIGH YIELDING SHORT DURATION SUITABLE URD (*VIGNA MUNGO* L.) VARIETY FOR DIARA LAND OF BIHAR

Rakesh Deo Ranjan[1], Chandrasekhar Azad[2*] and Shivnath Das[3]

[1]Deptt. of Plant Breeding and Genetics, [2]Deptt. of Plant Pathology, [3]Deptt. of Agronomy
Bihar Agricultural College, Sabour, Bhagalpur-813210 Bihar
***Corresponding Authour** (Chandrasekhar Azad) **Email :** azadbau81@gmail.com*

ABSTRACT

In Bihar, about 5.35 lac hectare of Agricultural land comes under Diara land originated from entry point of holy river Ganga at Buxar to end point of Pirpaiti which usually undulated during rainy season and spread over both side of river embankment. The prevailing cropping system is Kharif Maize followed by mixture of rabi crops predominated by Rabi maize, wheat, oilseeds and to some extent pulses also. Animal husbandry played a virtual role in these areas and is a regular source of income of the people. Urd bean commonly known as Kali is being grown as catch crop in between past Kharif and Rabi just after receed of flood water both for quick availability of green fodder as well as for grown which serve in hand money for the successfully utilization of Rabi crops. Soil texture and structure of Diara land is best suited to the major cereal crops viz; wheat and Maize.

Key words : *Urd, high yielding, varieties and diara.*

Pulses play an equally important role in rainfed and irrigated agriculture by improving physical, chemical and biological properties of soil and considered as excellent crops for natural resource management, environmental security, crop diversification and consequently for viable agriculture. Green gram is extensively grown in all types of soil under varying climatic conditions.

Black gram (*Vigna mungo* L.) belongs to family Fabaceae sub family papilionaceae, is being grown as one of the principle pulse crops popularly known as Urd bean. In India Urd bean is grown in 3.11 Mha areas with total production of 1.90MT and average productivity is 642 kg/ha. Presently the available varieties of Urd bean generally mature in 85-90 days which forced delay sowing of rabi crops particularly those who are interested grown Urd for grain purpose. There are certain local cultivar which matured in 65-70 days like Tinpakhia is still being grown by the farmer but the yielding ability is very poor on one hand and very limited number of recommended varieties like $T_{9,,}$ Pant Urd, Pand Urid-19 and Navin other hand which units the option on the hand. Hence, to facilitate timely sowing of Rabi there urgent need to evolve short duration (70-75 days) high yielding Urd varieties best suited to Diara land especially for catch crop. Keeping these views in mind the Res. Project " Collection and evaluation of local as well as promising culture to select short duration high yielding Urd variety for Diara land of Bihar" was conducted during Kharif, 2010 at BAC farm, Bihar Agricultural College Sabour, Bhagalpur. Thirteen genotypes viz. Pant U-31, Mash-1-1, Mash-114, Mash-338, Utra, IPU-02-43, Shekhar, PU-19, PU-31, IPU-94-1, T9, SU-10-724 and SU-10-726 were collected from IIPR, Kanpur, T.C.A., Dholi and Bhagalpur district including local collection collected from Diara (Bihar) like Naugachia, Pirpati, Jagdishpur and planted in RBD design in three replication of plot size 3.0 m X 1.5 m, row spacing 30 cm with fertilizer 15 N: 40 P: 0 K and T9 was used as a test crop. was evaluated at BAU, Sabour (Latitude:25.15'.05"N, Longitude: 48.2'.42" E, Altitude:45.75 m above the mean sea level)under normal conditions over three consecutive year (2011-12, 2012-13 and 2013-14). Each trial was laid out in a randomized complete block design with three replications. The minimum and maximum temperatures ranged between 23-25^{0}C to 30-35^{0}C respectively.

MATERIALS AND METHODS

A field study was conducted at Bihar Agricultural University, Farm at Sabour (Bihar) during the rainy

season (kharif) of 2012. The soil of the experimental site was sandy loam in texture having 0.82% organic carbon, 233 kg nitrogen,12.5 kg P_2O_5 and 213 kg K_2O/ha before the start of experiment. The soil was acidic with 5.7 value of soil pH.

The experiment consisting of 13 thirteen varieties viz. Pant U- 31, Mash-1-1, Mash-114, Mash-338, Utra, IPU-02-43, Shekhar, PU-19, PU-31, IPU-94-1, T9, SU-10-724 and SU-10-726 was laid out in a randomised block design with three replications. A basal dose of 20 kg N/ha through urea and phosphorus as per treatment through single super phosphate was applied. The crop was sown on 20th August 2012 by Kera method in rows 30 cm apart using 20 kg seed/ha. Primary branches per plant at pod formation stage, No. of seeds per pod, plant height, days to maturity and disease incidence was at different dates were recorded from the ten tagged plants from the net plot area seed yield from net plot area was recorded after drying the seeds to 12% moisture. Powdery mildew disease incidence was recorded at scale 0-5, 0 shows No infection, 1 indicated 0.1-10%, 2 indicated 10-25%, 3 indicated 25-50%, 4 indicated 50-75% and 5 >75% level of infection. Days to 50% flowering was noted in terms of days from sowing of seeds to 50% plants with flowering, Number of branches/plants on per plant basis was counted at the time of harvesting and averaged. Plant height was measured in cm from ground level to tip of main axis of the plant; Number of clusters bearing pods were counted on five randomly selected plants and averaged. Number of seeds of five pods from each plant were counted and averaged, Days to maturity was recorded in days from sowing to 80% pods matured, 1000 seed weight (g) was recorded in grams for individual genotype and yield/ plot (kg/ha) of sun-dried seeds per plot (4-meter size) was recorded.

RESULTS AND DISCUSSION

It has been found that Physiological characters like Days to 50% flowering, Number of branches/plants, Plant height (cm), Number of pod clusters/plant, Number of seeds/pod and Days to maturity were recorded Table-1. Among all genotypes IPU-02-43 and Utra recorded significant growth and compared to T9 check.

Table-1 : Estimation of yield (q/ha) on performance of different varieties.

Sl. No.	Varieties	Yield (q/ha)
1.	Pant U-31	6.990
2.	Mash-1-1	5.632
3.	Mash-114	4.706
4.	Mash-338	5.725
5.	Utra	8.433
6.	IPU-02-43	8.842
7.	Shekhar	7.499
8.	PU-19	7.916
9.	PU-31	7.907
10.	IPU-94-1	8.031
11.	T9 (check)	7.854
12.	SU-10-724	7.893
13.	SU-10-726	7.869

Days to 50% flowering : The range of variation for this character was from 43 days to 60 days with an average of 50.31 days. The genotype T9 (49days) and Mash-1-1 (60 days) were recorded as late flowering type and IPU-02-43 (44 days) as early flowering type.

Number of branches/plants : It has been observed that the number of branches per plant ranged from 4.0 to 9.0 with an average of 5.37 branches. The maximum number of branches per plant was recorded in IPU-02-43 (9.00) whereas, the lowest number of branches per plant was recorded in T9 (5.00) followed by Shekhar (5.00. Sharma *et al*. (2006) for number of branches/plants are in agreement with the present findings. Similar findings were also reported by Sagar & Sekhar (2001) and Mansingh and Singh (2003) for this trait in urd bean at phenotypic level.

Plant height (cm) : Varieties differed significantly with respect to primary branches/plant, plant height and maturity (Table 2). The plant height varied from 29.00 cm to 49.00 cm with an average plant height of 37.87 cm. Among all genotypes, IPU- 02-43 (49.00 cm) and Utra (47.00) was recorded as taller height and T9 (27.00 cm) as dwarf genotype. The above results are in support with the results obtained by Natarajan and Rathinasamy (1999), Natarajan and Rathinasamy (2000) for seed plant height. Yadav *et al*. (2001) reported similar result for Plant height (cm) in black gram.

Number of pod clusters/plant : The average number of pod clusters/plant was 38.37 with a range of 28.00 to 52.00. The genotype IPU-02-43 (52.00) recorded the highest number of clusters per plant and T9 (29.00) had

Table-2 : Estimation of physiological traits on performance of different varieties.

Sl. No.	Entries	Days to 50% flowering	No. of primary branches/ plant	Plant height (cm)	No. of pods/ plant	No. of seed/ pod	1000 grain weight (gm)	Days to maturity
1.	Pant U-31	45	8	37	40	5	48.00	78
2.	Mash-1-1	60	4	29	44	6	50.10	79
3.	Mash-114	43	4	29	44	7	54.00	79
4.	Mash-338	46	5	35	44	6	52 .00	80
5.	Utra	48	7	47	39	8	55.00	75
6.	IPU-02-43	47	9	49	52	7	55.20	73
7.	Shekhar	55	5	37	43	6	52.00	80
8.	PU-19	47	6	38	37	7	41.00	80
9.	PU-31	43	6	32	35	7	53.00	81
10.	IPU-94-1	48	7	37	37	7	51.00	77
11.	T9	49	9	27	29	7	53.00	81
12.	SU-10-724	56	6	35	30	7	49.00	80
13.	SU-10-726	59	6	37	38	6	50.00	80

lowest number of clusters per plant. Previous results reported by Babu *et al*. (2010), Revanappa and Kajjidoni (2005) was in agreement with present findings. Similar findings for number of branches with number of pod clusters/plant and number of pods/plants have also been reported by Gupta *et al*. (2003). Sharma *et al*. (2006) for number of branches /plants are in agreement with the present findings.

Number of seeds/pods : The average number of seeds/pods was 7.04 with range of 6.13 to 8.13 seeds/ pod. The genotype IPU-02-43 (8.00) was having maximum number of seeds/pod and T9 had lowest number (6.10) of seeds/pod. Yadav *et al*. (2001) reported similar result for number of seeds/pods in black gram.

Days to maturity : The average maturity period was 76.21 days with minimum of 81.00 days and maximum of 71.00 days. The genotype IPU- 02-43 (73.00 days) recorded as early maturing and T9 (80.00 days), Mash-114 (81.00 days) as late maturing genotype.

Yield attributing characters : Yield attributing characters like 1000 grain weight (g) and optimum yield (q/ha) was recorded Table 2. Among all genotypes IPU-02-43 and Utra recorded maximum significant yield as compared to T9 check.

1000 grain weight (g) : The mean 1000 grain weight was 50.05 (g) ranging from 47.00 to 56.93 (g). The genotype T9 (40.00g) recorded minimum and IPU-02-43 (55.13 g) had maximum 1000 grain weight.

Yield (q/ha) : The mean yield was 6.84 and ranged from 4.70 to 8.842 (q/ha). The genotype Mash-114 (4.70 q/ha) recorded the lowest and IPU-02- 43 (8.842 q/ha) had the highest Yield (q/ha). These findings are in accordance to the findings of Kumar and Reddy (1986) [5] who reported different genotypes 1000 grain wt and yield/plant. Similar findings were also reported by Urkurkar *et al.* (1999), Sagar and Sekhar (2001) and Raika *et al*. (2000) for seed yield and harvest index suggesting that selection for high harvest index will give higher yield in black gram.

CONCLUSIONS

The promising genotypes were IPU-02-43, Utra, Mash-114 and SU-10-726 on the basis of their yield performance with 1000 grain weight of 55.13gm, 55.0gm, 54.00gm and 50.0gm respectively. Earliest maturing genotype was IPU-02-43 in 73.00 days with maximum production of 8.84 q/ha. On the basis of yield, maturity and minimum disease incidence it can be suggested the entries IPU-02-43, Utra, Mash-114and SU-10-726 for cultivations in Diara land of Bihar.

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