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Research note

Evaluation of blackgram (*Vigna mungo* L.) genotypes in mid hill regions of Nepal

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Twelve blackgram genotypes were assessed for grain yield and its attributing traits at National Plant Breeding and Genetics Research Centre, Khumaltar, Lalitpur, Nepal in summer season of 2017-2018. The genotypes were sown in randomized complete block design with three replications. Plot size was 4x2.4 m² with a spacing of 20x50 cm. The traits like plant height, early plant stand/m², days to flowering, days to maturity, final plant stand /m², pods/plant, unfilled pods/plant and grain yield were recorded. The two years combined results showed non-significant differences among genotypes for all the characters except 100 seed weight. Based on average yield performance, genotypes BLG0036-1, Shekhar-1 and BLG0066-1-1 performed better than the others and they were considered as pipeline varieties for further evaluation.

Key words: *blackgram, grain yield, genotypes evaluation, mid hill*

INTRODUCTION

Pulses are the main sources of dietary protein for Nepalese people. Among various pulse crops, blackgram (*Vigna mungo* L.) is the most important legume crop for the mid hills farmers of Nepal (Gharti et al., 2014). It is grown widely and up to an altitude of 1800m above mean sea level. It is a short day plant and very sensitive to photoperiod. Optimum temperature require for its growth and development is 28 to 32 ^{0}C. It was cultivated about 23,492 ha area with 19,928 mt production and average productivity of 0.84mt/ha in 2018/19 (MoALD, 2019). Though blackgram is the leading hill pulse crop, its production and productivity is very low compared to the other Asian countries. Till now only one improved blackgram variety (Kalu) is released for mid hill based farmers from Nepal government and therefore farmers have very limited choice for the varieties. Most of the farmers grow traditional blackgram varieties which are low yielding, most of them are disease and pest susceptible (Neupane et al., 2021). Therefore the national average productivity is also low. Since very limited progress has been made in blackgram as compared to other grain legumes, there is urgent need to introduce new high yielding genotypes which are disease/pest resistant and abiotic stress tolerant. Crossing among the elite genotypes and selection for best line could accelerate the blackgram improvement program and help to identify promising line. This experiment involved to evaluate 12 blackgram genotypes in different agro-ecological regions of mid hill Nepal.

MATERIALS AND METHODS

Experimental site

The experiment was carried out at the experimental field of National Plant Breeding and Genetics Research Centre, Khumaltar, Lalitpur, Nepal in summer season 2017-2018. Geographically, this place is located at about 27^{0}4' N north latitude and 85^{0}2'E east longitude and altitude of 1350 m.

Experimental design

The experiment was laid out in randomized complete block design with three replication. Plot size was 4x2.4 m^2 with row to row 50cm and plant to plant 20 cm spacing.

Plant materials

Twelve blackgram genotypes were used as the experimental materials. All the genotypes were collected from National Grain Legumes Research Program, Khajura, Banke, Nepal (Table 1).

Table 1. List of blackgram genotypes used in the experimental work

SN	Genotypes
1	BLG0066-1-1
2	BLG0092-1
3	BLG0072-1
4	BLG0035-1
5	BLG0095-1-1
6	BLG0041-1
7	BLG0024-1-2
8	BLG0036-1
9	BLG0079-1
10	Shekhar-1
11	Bardiya local
12	Khajura Mass

Intercultural operations

The plots were fertilized with poultry manure (5 t/ha) and chemical fertilizers at the rate 20:40:20 NPK kg/ha, Sulphur@20 kg and Borax @0.5kg/ha were applied at the time of sowing. Hand weeding was done twice at 25 and 45 days after seeding. Other crop management practices were adopted as per the standard package of practices.

Data collection

Data on plant height, early plant stands/m^2, final plant stands/m^2, day to flowering, day to maturity, number of pods/plant, no of unfilled pods/plant, no of filled pods/plant, hundred seed weight and grain yield were recorded. Plant height was measured as the height from the base of the plant to the tip of the last leaf, early plant stand/m2 was measured as the number of plants per square meter, final plant stand/m2 was measured as the number of plants per sqaure meter, days to flowering was measured as more than 80% flowering in the plots, days to maturity was measured as more than 80% maturity in the plots, pod per plant was measured as total number of pods in a single plant, number of filled pods per plant was measured as total number of filled pods with seeds in a plant, number of unfilled pods per plant was measured as total number of unfilled pods without seeds in a plant, 100 seed weight was calculated as counting 100 seeds randomly and then weighting it and grain yield was calculated as weighing the seeds produced in a plot and then converted in to kg/ha.

Statistical Analyses

The experimental data were processed by using MS Excel 2010 and analyzed by using Genstat 13.2. The treatment means were compared by the Least Significant Difference (LSD) test at 5% level of significance (Gomez and Gomez, 1984; Baral et al., 2016).

RESULTS AND DISCUSSION

Mean performance of blackgram genotypes

Genotypes were found significantly different only for 100 seed weight and non-significant differences were observed in days to flowering, days to maturity, early stand, final stand, plant height, grain yield, pod/plant and seed per pod. Flowering days ranged from 36 days (BLG0066-1-1) to 42 days (BLG0024-1-2).Maturity days ranged from 70 days (BLG0072-1) to 73 (Khajura Mass). Maximum grain yield was found in BLG0036-1 (203 kg/ha) followed by Shekhar 1 (183 kg/ha) and minimum yield recorded in BLG0041-1 (76 kg/ha). Grain yield of different genotypes ranged from 76 kg/ha (BLG0041-1) to 203 kg (BLG0036-1) (Table 2, Figure 1).

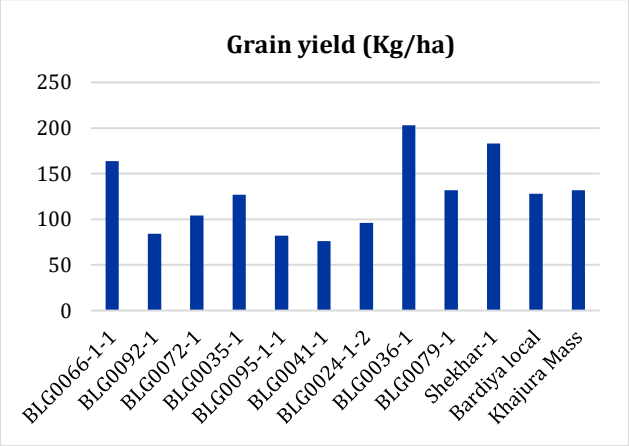

Figure 1. Grain yield of blackgram genotypes expressed in Kg/ha

Maximum pod per plant was found in BLG0066-1-1 (11) and minimum in BLG0035-1 (7). Plant height (17 cm) was nearly same for all the genotypes except Bardia local which measured 16 cm. Similarly, seed per pod was same for all the genotypes and equals 6. Similar results were reported by Neupane (2021) and Jayamani et al. (2014). Almost all genotypes were found resistant to all major insects and pests. Kumar and Singh (2014) also studied 25 blackgram genotypes and evaluated for resistance to major insects and pests including white fly, jassids and thrips and found only three genotypes RVSU-11-8, KPU-1-10 and AKU-10-4 resistance to the above pests. In the same way our genotypes were also found resistant against downy mildew.

Table 2. Combined performance of soybean genotypes evaluated at Khumaltar, Lalitpur during 2017-2018

Genotypes	Flowering day	Early stand	Final stand	Maturity days	100 seed weight	Plant height	Grain yield (kg/ha)	Pod/Plant	Seed/pod
BLG0066-1-1	36	13	10	72	8	17	164	11	6
BLG0092-1	41	11	10	71	7	17	84	10	6
BLG0072-1	40	10	10	70	7	17	104	10	6
BLG0035-1	39	12	11	71	7	17	127	9	6
BLG0095-1-1	40	11	9	70	7	17	82	7	6
BLG0041-1	41	12	8	70	7	17	76	8	6
BLG0024-1-2	42	11	8	71	7	17	96	9	6
BLG0036-1	40	10	11	72	6	17	203	9	6
BLG0079-1	40	10	10	70	7	17	132	8	6
Shekhar-1	40	10	11	73	7	17	183	8	6
Bardiya local	40	13	10	71	6	16	128	10	6
Khajura Mass	40	12	12	73	6	17	132	9	6
Mean	40	12	10	71	7	17	141	9	6
CV (%)	4.6	27.57	29.21	3.7	9.4	7043	59	20	5.5
p value	0.1994	0.974	0.9791	0.9619	0.0516	0.3283	0.3964	0.3285	0.7424

CONCLUSION

Blackgram is a highly grown pulse crop of mid hill Nepal but still farmers relies on local landraces which have low yield and susceptible to disease and pests. Thus few promising genotypes have been identified which could be further tested to farmers field in different geographical regions and release as variety. The pipeline genotypes based on average yield performance are BLG0036-1, Shekhar-1 and BLG0066-1-1.

AUTHOR CONTRIBUTIONS

All the authors are involved in the experiment and generation of data for this manuscript.

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COMPETING INTERESTS

The authors declare that they have no competing interest

ETHICS APPROVAL

Not applicable

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