



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(5): 2019-2022
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www.thepharmajournal.com

Received: 25-02-2023

Accepted: 29-03-2023

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Performance of ridge gourd (*Luffa acutangula* Roxb.) genotypes for yield and yield attributes in agro climatic conditions of Prayagraj

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Abstract

An experiment was conducted on Genetic variability and character association in eight genotypes of Ridge Gourd with three replications during summer season 2021-22 at the Research Field of Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj. The observations were recorded on various yield and yield contributing characters of ridge gourd. The results from the present investigation revealed that on the basis of mean performance for Days to first flowering (3.54), Days of Emergence of first male (30.78) & female flowers (37.67), No. of male & female flowers (6.89 & 1.53), Sex ratio (34.0), Nodes Number at which First Male & female Flower appears (3.33 & 6.78), Days to First Fruit setting (28.33), Day To First Fruit Picking (42.92), Fruit Weight (162g), No. of Fruits Per Plant (10.22), Fruit Yield Per Plant (2.53 kg), Fruit Length (25.44 cm), Fruit Girth (45.01cm) and fruit yield 90.25 q/ha was found superior in IET 2021/RIGVAR-6 genotype. This genotype was found superior based on the overall performance of different ridge gourds cultivars for growth and yield in Prayagraj conditions.

Keywords: Ridge gourd, genotypes, growth, yield & yield attributing characters

1. Introduction

Ridge gourd [*Luffa acutangula* (L.) Roxb.], popularly known as Kalitori and also called as angled gourd, angled loofah, Chinese okra, silky gourd and ribbed gourd, belongs to genus *Luffa* of "Cucurbitaceae" family. Ridge Gourd (*Luffa acutangula* (Roxb.) L.) is a monoecious and highly cross pollinated important tropical cucurbitaceous vegetable crop cultivated throughout India. Every 100g of the edible portion of ridge gourd contains 0.5g of fiber, 0.5 percent of protein, 0.35 percent of carbohydrate, 37 mg of carotene, 5.0 mg of vitamin c, 18 mg of calcium and 0.5 mg of Iron (Hazra and Som, 2005) [3]. There are number of cultivars available with wide range of variability in shape of fruits. The yield potential of existing cultivars is low and there are several factors responsible for low yield of ridge gourd in Prayagraj. Lack of high yielding variety is one of the main reasons for low yield of ridge gourd. In nut shell, to improve the yield and for developing a new variety, collection and evaluation of germplasm is a pre requisite in a specific crop improvement programme. Hence, an effort was made to identify the potential cultivar with desirable growth and yield parameters.

2. Material and Methods

The experiment was conducted during the summer seasons of 2021-22 at the Research Field of Department of Horticulture, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj using randomized block design with three replications. During the period of experimentation the maximum temperature of the location reaches up to 46 °C – 48 °C and seldom falls as low as 4 °C – 5 °C. The relative humidity ranges between 20 to 94 percent. The average rainfalls in this area are around 1013.4 mm annually. Treatment was in a plot of single row in each replication. Recommended cultural practices were followed as per the package of practices of horticultural crops of University of Agricultural Sciences, Dharwad (Anon., 2010). Five randomly selected plants from each genotype were subjected to made observation on Plant height, Primary branches at 30 & 60 DAS, Plant spread, Days to first flowering, Days of Emergence of first male & female flowers, No. of male & female flowers, Sex ratio, Nodes Number at which First Male & female Flower appears, Days to First Fruit

setting, Day To First Fruit Picking, Fruit Weight, No. of Fruits Per Plant, Fruit Yield Per Plant, Fruit Length, Fruit Girth Yield per Hectare and Vine Length at Harvest Variability for different qualitative characters and expected genetic advance at 5 percent intensity were calculated as per Burton (1952)^[10] and Johnson *et al.*, (1955)^[11], respectively.

3. Result and Discussion

3.1 Vine length at 30 & 60 DAS

The data revealed from Table 1 the maximum vine length was recorded in "IET 2021/RIGVAR-6" genotype 135.44 & 225.55 cm at 30 and 60 day after transplanting respectively while minimum vine length was recorded in Jaipuri Long genotype 122.28 & 212.35 cm at 30 and 60 day after transplanting. The results are in agreement with the findings of Khatoon *et al.* (2016)^[5], Karthik *et al.* (2017)^[4] and Bhargava *et al.* (2017)^[1].

3.2 Primary branches at 30 & 60 DAS

The data revealed from Table 1 the No. of primary branches were counted at last harvest and the observations were recorded. Maximum number of primary branches were observed in the genotype IET 2021/RIGVAR-6 3.11 & 4.02 at 30 & 60 DAT respectively and minimum number of primary branches was recorded in the genotype Jaipuri Long 2.44 & 3.25 at 30& 60 DAT respectively. Similar results were obtained by Rabbani *et al.* (2012)^[6], Bhargava *et al.* (2017)^[1], and Karthik *et al.* (2017)^[4].

3.3 Days to first flowering

The data revealed from Table 1 the Days taken from the day of transplanting to the anthesis of first flower was recorded among the genotype IET 2021/RIGVAR-6 showed earliness to open first flower (3.54), and the genotype "Jaipuri Long" took maximum days (4.80) for female flower appearance. The results are in agreement with the findings of Khatoon *et al.* (2016)^[5], Karthik *et al.* (2017)^[4] and Bhargava *et al.* (2017)^[1].

3.4 Days to Emergence First Male flower

The data revealed from Table 1 the minimum number of days to emergence first male flowering were recorded in IET 2021/RIGVAR-6 (30.78) followed by IET 2021/RIGVAR-1 (30.89). The maximum number of days to emergence first male flowering was recorded in Jaipuri Long (32.00). The days to first male flower emergence plays an important role in deciding the earliness or lateness or crop in general. The variation in first male flower emergence might have been due to intermodal length, number of intermodal and vigour of the crop. Similar findings were also recorded by Triveni *et al.* (2020)^[8].

3.5 Days to Emergence First Female flower

The data revealed from Table 1 the minimum number of days to emergence first male flowering were recorded in IET 2021/RIGVAR-6 (37.67) followed by IET 2021/RIGVAR-1 (38.95). The maximum number of days to emergence first male flowering were recorded in Jaipuri Long (43.67). The days to first female flower emergence play a vital role in deciding the earliness or lateness or crop in general. The variation in first female flower emergence might have been due to intermodal length, number of intermodal and vigour of the crop. Similar findings were also recorded by Triveni *et al.* (2020)^[8].

3.6 Nodes number at which first male flower appears

The data revealed from Table 1 the minimum number of nodes in male flowering were recorded in IET 2021/RIGVAR-5 (2.67) followed by Jaipuri Long (2.76). The maximum number of male flowering was recorded in IET 2021/RIGVAR-2 (3.89). The number of nodes plays a vital role in deciding the earliness or lateness or crop in general. The variation in first flower emergence might have been due to intermodal length, number of intermodal and vigour of the crop. Same findings were reported by Gautam *et al* (2017)^[11].

3.7 Nodes number at which first female flower appears

The data revealed from Table 1 the minimum number of Nodes number at which first female flower appears were recorded in Pusa Nasdar (4.94) followed by IET 2021/RIGVAR-5 (5.05). The maximum number of Nodes number at which first female flower appears were recorded in IET 2021/RIGVAR-6 (6.78). The days to first flower emergence play a vital role in deciding the earliness or lateness or crop in general. The variation in first flower emergence might have been due to intermodal length, number of intermodal and vigour of the crop. Same findings were reported by Gautam *et al* (2017)^[11].

3.8 Days to first fruit Picking

The data revealed from Table 2 the minimum number of days for first fruit Picking were recorded in IET 2021/RIGVAR-6 (42.92) followed by IET 2021/RIGVAR-1 (44.00). The maximum number of days to emergence first fruit setting was recorded in IET 2021/RIGVAR-5 (53.00). The days to first harvesting from sowing plays an important role in deciding the earliness and lateness of fruiting the different genotypes of ridge gourd. It may be due to mobilization of food materials from source to sink in best treatment. Similar findings were reported by Khatoon *et al.* (2016)^[5], Bhargava *et al.* (2017)^[1].

3.9 Fruit weight

The data revealed from Table 2 the individual fruit weight was recorded by weighing the fruits after harvest. Individual fruit weight was recorded maximum in IET 2021/RIGVAR-6 (162.00 g) and minimum (143.02 g) was recorded in the genotype Pusa Nasdar. Similar results were obtained by Rabbani *et al.* (2012)^[6], Karthik *et al.* (2017)^[4] and Bhargava *et al.* (2017)^[1].

3.10 No of fruit per plant

The data revealed from Table 2 number of fruits per plant was recorded by tagging 5 plants and was recorded at every harvest. The genotype "IET 2021/RIGVAR-6" was having more number of fruits per plant (10.22) and the genotype "Pusa Nasdar" & IET 2021/RIGVAR-5 is having minimum number (5.33) of fruits per plant. Similar results were reported by Hanumegowda K. (2011)^[2] and Yadav *et al.* (2017)^[9].

3.11 Fruit yield per Plant

The data revealed from Table 2 the total weight of fruit obtained in each harvest was recorded from the five labeled plants and the mean value per plant was calculated and expressed in kg per plant. Fruit yield was maximum in the genotype "IET 2021/RIGVAR-6" (2.53 kg) and minimum in the genotype Jaipuri Local (1.43 kg). Similar findings were

obtained by Rabbani *et al.* (2012)^[6], Karthik D *et al.* (2017)^[4] and Bhargava *et al.* (2017)^[1].

3.12 Fruit length

The data revealed from Table 2 the length of fruit was measured for selected fruits and expressed in centimeters. Fruit length was recorded maximum (25.44 cm) in the genotype “IET 2021/RIGVAR-6” and minimum (15.00 cm) in the genotype “Pusa Nasdar” was recorded. The findings were supported by Rabbani *et al.* (2012)^[6], Khatoon *et al.* (2016)^[5], Bhargava *et al.* (2017)^[1] and Karthik *et al.* (2017)^[4].

3.13 Fruit Girth

The data revealed from Table 2 maximum fruit girth (45.01 cm) was recorded by “IET 2021/RIGVAR-6” followed by “IET 2021/RIGVAR-1” (40.78 cm). Similar variation in fruit characters was observed in bottle gourd by Suganthi (2008)^[12].

3.14 Yield per Hectare

The maximum yield (q/ha) was recorded in “IET

2021/RIGVAR-6” (90.25 q/ha), followed by “IET 2021/RIGVAR-1” (88.35 q/ha), “IET 2021/RIGVAR-2” (79.65 q/ha), which were on par with each other and the significantly lowest yield (36.31 q/ha) was found in the case of Pusa Nasdar. The increase in yield and yield attributes to enhanced photosynthesis, accumulation of carbohydrates, and development of cell wall and cell differentiations as they boost up overall vegetative growth, biological activity of the plants and retention of more flowers and fruits which increased number of fruits and size of fruits besides increasing yield. Similar findings were also recorded by Triveni *et al.* (2020)^[8].

3.15 Vine length at harvest

Vine length was measured at last harvest with the help of meter scale by measuring from base to the growing tip of vine. The genotype “IET 2021/RIGVAR-6” recorded maximum vine length (2.95 m) and minimum (2.55 m) vine length was recorded in the genotype “Jaipuri long” Similar results were obtained by Rabbani *et al.* (2012)^[6], Khatoon *et al.* (2016)^[5], Karthik *et al.* (2017)^[4] and Ramesh *et al.* (2018)^[7].

Table 1: Mean performance of 8 genotypes of Ridge gourd for different Quantitative Characters

Characters	Vine Length 30 DAT	Vine Length 60 DAT	Primary Branches 30 DAT	Primary Branches 60 DAT	Days to First Flowering	Days To Emergence Of First Male Flowers	Days To Emergence Of First Female Flowers	Nodes Number at which First Male Flower Appears	Nodes Number at which First Female Flower Appears
IET 2021/RIGVAR-1	133.89	223.78	3.09	3.67	3.73	30.89	38.95	2.89	6.49
IET 2021/RIGVAR-2	132.33	222.47	2.89	3.44	3.81	30.94	40.56	3.89	6.03
IET 2021/RIGVAR-3	131.33	221.25	2.85	3.33	4.00	31.00	40.98	3.00	5.88
IET 2021/RIGVAR-4	131.17	221.19	2.78	3.30	4.07	31.03	41.47	3.55	5.60
IET 2021/RIGVAR-5	124.78	214.87	2.57	3.27	4.67	31.67	43.01	2.67	5.05
IET 2021/RIGVAR-6	135.44	225.55	3.11	4.02	3.54	30.78	37.67	3.33	6.78
Jaipuri Long	122.28	212.35	2.44	3.25	4.80	32.00	43.67	2.76	5.24
Pusa Nasdar	125.00	215.25	2.67	3.29	4.33	31.11	42.78	3.11	4.94
F-Test	S	S	S	S	S	S	S	S	S
S. Ed. ±	1.94	0.86	0.24	0.37	0.17	1.55	0.67	1.51	0.84
CD at 5%	3.04	1.86	0.12	0.19	0.36	3.20	1.46	1.58	1.72
CV	4.90	0.47	0.39	3.05	5.01	6.35	3.42	0.84	2.71

Table 2: Mean performance of 8 genotypes of Ridge gourd for different Quantitative Characters

Characters	Day To First Fruit Picking	Fruit Weight (g)	No. of Fruits Per Plant	Fruit Yield Per Plant (kg)	Fruit Length (cm)	Fruit Girth	Yield per Hectare (q)	Vine Length at Harvest (m)
IET 2021/RIGVAR-1	44.00	154.67	9.67	2.17	23.33	40.78	88.35	2.90
IET 2021/RIGVAR-2	45.89	153.10	7.05	2.08	21.33	38.33	79.65	2.88
IET 2021/RIGVAR-3	47.83	149.78	7.89	1.92	20.33	35.00	67.29	2.72
IET 2021/RIGVAR-4	49.65	146.33	6.67	1.83	18.33	32.33	59.29	2.68
IET 2021/RIGVAR-5	53.00	147.33	5.33	1.57	17.33	30.78	48.21	2.58
IET 2021/RIGVAR-6	42.92	162.00	10.22	2.53	25.44	45.01	90.25	2.95
Jaipuri Long	45.50	144.89	7.33	1.53	16.00	27.33	41.91	2.55
Pusa Nasdar	44.98	143.02	5.33	1.43	15.00	25.33	36.31	2.62
F-Test	S	S	S	S	S	S	S	S
S. Ed. ±	3.91	0.54	0.28	0.03	0.27	0.25	1.13	0.55
CD at 5%	8.47	1.17	0.61	0.07	0.59	0.55	2.49	1.19
CV	3.06	1.33	4.64	1.98	1.7	0.89	2.11	0.33

4. Conclusion

Hence it can be concluded that ridge gourd genotype “IET 2021/RIGVAR-6” having highest yield can be utilized further for crop improvement programs.

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