



Identify suitable guar gum genotypes for southern India based on yield and yield attributing traits

*¹ Zuby Gohar Ansari, ² K Aparna

¹ PhD Scholar, Department of Plant Physiology, JNKVV, Jabalpur, Madhya Pradesh, India

² Assistant professor, Department of Crop Physiology, N.S. Agricultural College, Markapur, Praksham, Andhra Pradesh, India

Abstract

The field experiment was conducted during *kharif*, 2015-16 at dry land farm, on sandy loam soils of Sri Venkateswara Agricultural College, Tirupati situated in Southern Agro-Climatic Zone of Andhra Pradesh. The experiment was layout in randomized block design with ten treatments and three replications. Ten guar genotypes were evaluated. As per the data on days to 50 per cent flowering and days to physiological maturity GAUG-841, GAUG-4703-1 and RGC-936-1 are short duration types (< 94 days) and other genotypes RGC-936, RGG-12-5, RGG-13-4, RGC-1003, RGG-12-3, RGC-986 and GA2G-0503 are long duration (> 100 days). The genotypes RGG-13-4 and RGG-12-3, which showed high seed yield and its attributes viz., number of clusters per plant and number of seeds per pod.

Keywords: guar, seed yield, 50 per cent flowering, days to physiological maturity and test weight

Introduction

Clusterbean [*Cyamopsis tetragonoloba* (L.) Taub] (2n = 14) is an under exploited leguminous vegetable belonging to the family Fabaceae. It is commonly known as guar, chavli kayi and khutti. It is a drought hardy and deep rooted annual legume. It is grown for fodder purpose, vegetable and green manure in arid and semi-arid regions of India over an area of (2014-15) 0.43 m ha with a production of 0.25 m tones and yield 567 kg ha⁻¹. In India, it is grown in Rajasthan, Gujarat, Haryana, Punjab, Uttar Pradesh, Madhya Pradesh and Orissa. Among the different states, Rajasthan alone occupies an area of 78%. Yield is a complex character and is known to be associated with a number of yield contributing traits and is highly affected by environmental variances (Tanksley 1983) [7].

Material and Methods

Field experiment was conducted at S.V. Agricultural College Farm, Acharya N.G. Ranga Agricultural University, Tirupati during *kharif* season, 2015. The experiment was laid out in a Randomized Block Design (RBD) with ten treatments and replicated thrice. The treatments consist of 10 genotypes of gum guar (RGC-986, RGC-936, RGC-1003, GAUG-841, RGG-12-5, RGC-936-1, RGG-12-3, RGG-13-4, GA2G-0503 and GAUG-4703-1). The crop was grown in a plot size of 3.0 x 4.5 m with a spacing of 45 cm x 20 cm.

Yield and Yield Attributes

Days to 50% Flowering

The number of days taken from sowing till 50 percent of plants initiated. Flowering was counted in three replications of each treatment and expressed as days to 50 percent flowering in all the varieties and shown in table 1.

Variability for days to 50 per cent flowering among genotypes ranges from 24.33 to 29.67 days. Such genotypic variability

for days to 50 per cent flowering in guar was reported by Raghuprakash (2006) [6], Anupam Chakraborty (2007) [1] and Patil (2014) [5].

Days to Physiological Maturity

The number of days taken from the date of sowing to the complete maturity of pods (clusters) i.e., 75 per cent of leaves turned yellow and pods ripened completely in each genotype in each replication and shown in table 1.

Phenotypic variability for days to physiological maturity among genotypes ranges from 89.67 to 104 days. Such genotypic variability for days to physiological maturity in guar was reported by Anupam Chakraborty (2007) [1] and Patil (2014) [5].

Number of Clusters per Plant

Total number of clusters for the five labeled plants was recorded as number of clusters per plant and shown in table 1.

Genotypic variability for number of clusters per plant ranged from 25.73 to 45.86. Such genotypic variability for number of clusters per plant was reported by Kalyani (2006) [3], Raghuprakash (2006) [6] and Patil (2014) [5] in guar genotypes.

Number of Seeds per Pod

The number of seeds per pod was calculated by averaging the number of seeds from all the pods from five tagged plants and expressed as number of seeds per pod and shown in table 1.

Genotypic variability for number of seeds per pod among genotypes ranges from 6.52 to 7.47. Such variability for number of seeds per pod was reported by Kalyani (2006) [3], Anupam Chakraborty (2007) [1] and Patil (2014) [5] in guar genotypes.

Test Weight (g)

One hundred seeds collected randomly without bias from net

plot and their weight was recorded treatment wise and replication wise and expressed as grams and shown in table 1. Genotypic variability for test weight ranged from 2.54 to 3.39 g. Such genotypic variability for test weight in guar was reported in guar (Anupam Chakraborty 2007) [1] and (Patil 2014) [5].

Seed yield (q/ha)

Seeds were threshed from the plants harvested from a marked area of one m² and computed to hectare and expressed in quintals/ha and shown in table 1.

Seed yields were recorded on square meter basis and were converted to quintals per hectare. Large variability for seed yield among genotypes was recorded and it was ranged from 12.12 to 23.47 q ha⁻¹. Such genotypic variability for seed yield in guar was reported by Anupam Chakraborty (2007) [1], Jitendra *et al.* (2014) [2] and Patil (2014) [5].

Result and Discussion

Yield and Yield Attributes

Days to 50% Flowering

Among the genotypes significant variability for days to 50 per

cent flowering was observed. Among the ten guar genotypes GA2G-0503 (29.67 days) recorded highest days to 50 per cent flowering followed by RGC-936 and RGG-12-3 (28.67 days) whereas RGC-936-1 (24.33 days) recorded lowest days to 50 per cent flowering followed by GAUG-841 (24.67 days).

Days to Physiological Maturity

Among the genotypes significant variability for days to physiological maturity was recorded. GA2G-0503 (104 days) recorded highest days to physiological maturity followed by RGC-986 (103.67 days) whereas GAUG-841 (89.67 days) recorded lowest days to physiological maturity followed by GAUG-4703-1 (91.67 days). Based on data of days taken for 50% flowering and physiological maturity, the ten guar genotypes can be classified as short duration and medium duration types. GAUG-841, GAUG-4703-1 and RGC-936-1 are classified into short duration types (<94 days) and other genotypes RGC-936, RGG-12-5, RGG-13-4, RGC-1003, RGG-12-3, RGC-986 GA2G-0503 are grouped as medium duration (>100 days) in this southern agro climatic conditions.

Table 1: Evaluation of yield and yield attributing traits like days to 50% flowering, days to physiological maturity, no. of clusters per plant, no. of seeds per pod, test weight and seed yield

S. No	Genotypes	Days to 50% flowering	Days to physiological maturity	No. of clusters per plant	No. of seeds per pod	Test weight (g)	Seed yield (q/ha)
1.	RGC-986	28.67	103.67	28.87	6.94	2.54	12.94
2.	RGG-12-5	28	101.33	27.43	6.88	2.82	12.41
3.	RGG-13-4	28	102	43.9	7.38	3.06	23.43
4.	RGC-936	27.33	100.67	25.73	6.79	3.20	13.39
5.	RGC-936-1	25	94	36.87	7.26	3.23	19.23
6.	GA2G-0503	29.67	104	32.6	7.16	2.83	15.8
7.	RGC-1003	25.67	94.33	28.67	7.29	3.39	12.12
8.	RGG-12-3	28.67	101.33	45.86	7.30	3.19	23.47
9.	GAUG-4703-1	24.33	91.67	34.85	7.09	2.78	17.37
10.	GAUG-841	24.67	89.67	36.22	6.52	3.39	18.13
	Mean	27.001	98.267	34.10	7.056	3.04	16.829
	CD (P=0.05)	1.732	2.622	3.818	0.512	0.403	1.508
	SEM±	0.578	0.876	1.275	0.171	0.135	0.504

Number of Clusters Per Plant

Among the genotypes significant variability for number of clusters per plant was observed. RGG-12-3 (45.86) recorded highest number of clusters per plant followed by RGG-13-4 (43.9) whereas RGC-936 (25.73) recorded lowest number of clusters per plant followed by RGG-12-5 (27.43).

Number of Seeds Per Pod

Significant variability for number of seeds per pod was recorded among the genotypes. RGG-13-4 (7.38) recorded highest number of seeds per pod followed by RGG-12-3 (7.3) whereas GAUG-841 (6.52) recorded lowest number of seeds per pod of ten followed by RGC-936 (6.79). Similar variability in number of seeds per pod among guar genotypes was also reported by Jitendra *et al.* (2014) [2].

Test Weight

Significant variability for test weight was recorded among genotypes and RGC-1003 (3.52 g) and GAUG-841 recorded

highest test weight followed by RGC-936-1 (3.23 g) whereas RGC-986 (2.54 g) recorded lowest test weight followed by GAUG-4703-1 (2.78 g). Similar variability in test weight among guar genotypes was also reported by Jitendra *et al.* (2014) [2] and Palankar and Malabasari (2014) [4].

Seed Yield

The two genotypes RGG-12-3 and RGG-13-4 recorded significantly highest seed yield of 23.47 q ha⁻¹ and 23.43 q ha⁻¹ respectively. Four genotypes recorded moderate seed yield viz. RGC-936-1 (19.23 q ha⁻¹), GAUG-841 (18.13 q ha⁻¹), GAUG-4703-1 (17.37 q ha⁻¹) and GA2G-0503 (15.8 q ha⁻¹). Other four genotypes recorded less than 15 q ha⁻¹, which are RGC-986 (12.94 q ha⁻¹), RGG-12-5 (12.41 q ha⁻¹) h are RGC-936 (13.39 q ha⁻¹), RGC-986 (12.94 q ha⁻¹), RGG-12-5 (12.41 q ha⁻¹) and RGC-1003 (12.12 q ha⁻¹). The two genotypes RGG-12-3 and RGG-13-4 which recorded significantly highest yields compared to other genotypes also recorded higher yield

attributes viz. number of clusters per plant, number of seeds per pod.

Conclusion

All these ten guar genotypes were evaluated for suitability in this southern agro climatic zone of Andhra Pradesh. The two genotypes RGG-12-3 and RGG-13-4 are showed to be promising in terms of growth and yield in southern india.

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