



## Evaluation of the performance of gum guar varieties in north eastern Karnataka, India

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Received: September 24, 2015; Revised received: February 20, 2016; Accepted: May 30, 2016

**Abstract:** The climatic situation in north eastern parts of Karnataka (except Bidar district) is almost similar to that of Rajasthan. There is considerable area under rainfed situations and guar being a highly drought and temperature tolerant summer annual legume crop, there is hope for guar as an alternate and contingent crop during drought year in this region. With this objective effort were made to introduce, evaluate and to identify suitable gum guar varieties for North eastern parts of Karnataka. Ten gum guar varieties developed, released and cultivated in Rajasthan, Haryana and Gujarat state were evaluated in Agricultural Research Stations (ARS) located in Bidar, Gulbarga, Yadgiri, Bellary and Raichur districts of Karnataka during *Kharif* 2013-14. At Bidar, the top entry with respect to yield was HG-884 (679.00 Kg/Ha), Variety RGC-1031 (793.00 Kg/Ha) performed well with respect to seed yield in Gulbarga district. Genotypes GAUG-13 (614.00 Kg/Ha) and RGC-986 (501.00 Kg/Ha) recorded higher seed yield respectively, in Bellary and Yadgiri district. At Raichur GAUG-13, recorded highest seed yield of 1432.00 Kg/Ha. Over the locations genotype GAUG-13 recorded highest seed yield of 759.00 Kg/Ha followed by HG-884 (700.40 Kg/Ha) and RGC-986 (696.60 Kg/Ha). The varieties tested exhibited considerable significance differences among themselves at four locations, except at one location (Agricultural Research Station, Bheemarayanagudi, Yadgir district). Variety GAUG-13, recorded highest seed yield over three locations indicating its wider adaptability.

**Keywords:** Ancillary characters, Genotypes, Guar, Seed yield, Performance

### INTRODUCTION

North Eastern part of Karnataka experience frequent and intermittent drought coupled with high temperature. Every year farmers and Agricultural scientists are looking for some contingent plan with alternative crop to suit to the drought situations and failure of rains. The major crops of this region viz., Red gram, Bajra, Sunflower Sorghum during *kharif* and Bengal gram and rabi sorghum during rabi fail either due to initial or terminal moisture stress due to failure of rains. Under such situations, alternate crop like guar (*Cyamopsis tetragonaloba* L. Taub.) or cluster bean is a coarse, upright, bushy, a highly drought and temperature tolerant summer annual legume crop (belongs to the family *Leguminaceae*), which is very much successful in states like Rajasthan, Gujarat and Haryana (Kumar and Rodge, 2012 and NIAM, 2013) will come to the rescue of the farmers of North Eastern part of Karnataka. Guar crop is a native of India and Pakistan where it is grown principally for its green fodder and for the pods that are used for food and feed. It is grown in tropical Asia, Africa and America. The major world suppliers are India, Pakistan and the United States, with smaller acreages in Australia and Africa (Undersander *et al.*, 2006). Guar grain contains 25-30% of galactomannan

gum. This vegetable gum is extracted from the seed and used as a stabilizer or thickener in food and has industrial applications in textile, paper, and pharmaceutical manufacture and in oil well drilling. Guar seed meal contains up to 47% protein, this by-product of the gum extraction process and has great value as a stock feed, in particular for monogastric animals (Douglas, 2005).

The climatic situation in north eastern parts of Karnataka (except Bidar district) is almost similar to that of Rajasthan. There is considerable area under rainfed situations, Hence there is hope for guar as an alternate and contingent crop during drought year in this region (NIAM, 2013). With this objective effort were made to introduce, evaluate and to identify suitable gum guar varieties for north eastern parts of Karnataka.

### MATERIALS AND METHODS

The present study consists of ten gum guar varieties developed, released and cultivated in Rajasthan, Haryana and Gujarat state (HG-563, HG-884, GAUG-13, RGC-936, RGC-1031, RGC-936-1-5-1, Gourishankra-9, Gourishankar-15, HGS-356 and RGC-986) were evaluated in Agricultural Research Stations (ARS) located in Bidar (ARS, Bidar), Gulbarga (ARS, Gulbarga), Yadgiri (ARS, Bheemrayangudi), Bellary

(ARS, Hagari) and Raichur (Main Agricultural Research Station) districts of north eastern part of Karnataka during *Kharif* 2013-14. Varieties were evaluated in Randomized Block Design with three replications and spacing of 45 X 30 cms was followed. Recommended package of practices were followed to raise good crop. Observations were recorded on five competitive plants in each genotype in each replication for Days to 50 per cent flowering, Plant height, Branches per plant, Pods per plant, Pod Length, Seeds per pod, 1000 seeds weight and Yield (Kg/ ha). The mean values of yield were used for statistical analysis of critical difference between the genotypes, coefficient of variance (%) and to draw the conclusion whether there is significance or non significance between genotypes and between replications. (Mohamed and El Hag, 2001).

## RESULTS AND DISCUSSION

**Yield performance of gum guar genotypes at different locations during *Kharif* 2013-14:** Genotypes HG-884 (679.00 Kg/Ha), GAUG-13 (605.00 Kg/Ha) and

RGC-936 (596.00 Kg/Ha) performed well ARS, Bidar with respect to seed yield per hectare. At ARS, Gulbarga Varieties viz., RGC-1031 (793.00 Kg/Ha), RGC-936 (747.00 Kg/Ha) and GAUG-13 (679.00 Kg/Ha) performed well. Genotypes GAUG-13, RGC-936-1-5-1 and HG-884 recorded 614.00, 590.00 and 535.00 Kg/Ha seed yield respectively, in ARS, Hagari. In ARS, Bheemrayanagudi, variety, RGC-986 (501.00 Kg/Ha) recorded highest seed yield followed by GAUG-13 (465.00 Kg/Ha) and Gourishankar-9 (412.00 Kg/Ha). The genotypes viz., GAUG-13, RGC-986 and HG-365 recorded highest seed yield of 1432.00, 1400.00 and 1355.00 Kg/Ha respectively at Raichur. Over the locations genotype GAUG-13 recorded highest seed yield of 759.00 Kg/Ha followed by HG-884 (700.40 Kg/Ha) and RGC-986 (696.60 Kg/Ha). The varieties tested exhibited considerable significance differences among themselves and there was a non significant difference among the replications at four locations, except at one location (Agricultural Research Station, Bheemrayanagudi) (Table 1). Seed yield of guar reported in literature are highly variable, ranging from less than 1,000

**Table 1.** Yield (Kg/Ha) performance of gum guar varieties recorded at different locations of North Eastern Karnataka during 2013-14.

S.N.	Genotypes	Locations					Mean
		MARS, Raichur	ARS, Bheemrayangudi	ARS, Gulbarga	ARS, Bidar	ARS, Hagari	
1	GOURI SHANKAR-9	1106	412	324	420	443	541.00
2	GOURI SHANKAR-15	615	250	509	407	488	453.80
3	RG-936	1120	351	747	596	384	639.60
4	RGC- 936-1-5-1	1288	342	670	534	590	684.80
5	HGS-563	1250	376	636	509	435	641.20
6	HG-884	1265	378	645	679	535	700.40
7	RGC-1031	1086	320	793	565	525	657.80
8	GAUG-13	1432	465	679	605	614	759.00
9	RGC-986	1400	501	574	531	477	696.60
10	HG-365	1355	360	528	506	435	636.80
	CD (P=0.05)	415.23	91.13	186.81	109.97	123.01	
	CV (%)	20.31	14.15	17.84	11.98	14.56	
	Tab (5%) treatment	S	S	S	S	S	
	Tab (5%) replication	NS	S	NS	NS	NS	

S=Significance, NS=Non Significance.

**Table 2.** Data on ancillary characters of gum guar varieties recorded at Main Agricultural Research Station, Raichur during *Kharif* 2013-14.

S.N.	Genotypes	DFF	Plant Height (cm)	Branches / plant	Pods/ plant	Pod length (cm)	Seeds /pod	Test Wt. (gram)
1	GOURISHANKAR-9	37.667	95.67	8.33	77.87	5.33	7.33	34.73
2	GOURISHANKAR-15	41.333	114.47	0.00	73.07	5.41	6.93	35.43
3	RGC-936	38.667	104.60	8.93	91.00	5.69	6.37	39.20
4	RGC-936-1-5-1	38.000	104.27	8.87	84.13	5.80	7.53	35.54
5	HGS-563	35.333	99.00	8.07	77.40	5.49	7.33	36.10
6	HG-884	35.333	103.40	8.53	82.93	5.39	7.07	37.30
7	RGC-1031	47.667	138.80	0.00	73.07	5.42	7.80	36.27
8	GAUG-13	47.333	111.47	6.80	72.07	5.27	7.07	32.33
9	RGC-986	41.000	107.20	8.07	80.07	5.51	7.67	37.87
10	HG-365	38.000	110.13	7.53	76.60	5.49	7.73	34.93

DFF-Days to 50% flowering, Test Wt. - Test Weight.

Kg/Ha without irrigation (Tucker and Foraker, 1975) to 5,000 Kg/Ha in irrigated row plots (Beech *et al.*, 1989). In this experiment, guar showed an average seed production of 453.80 to 759.00 Kg/Ha, which represents a good production compared to the most of the reported yields (Jackson and Doughton, 1982; Kumar and Singh, 2002; Orazio Sortino and Fabio Gresta, 2007). These results may be due to favourable environmental conditions and to water not limiting production and also because this crop, especially in India, is often relegated to poorer land (Jackson and Doughton, 1982 and NIAM, 2013).

**Data on the ancillary characters recorded at main agricultural research station during Kharif 2013-14:** Days to fifty per cent flowering ranged from 35.33 (HG-563 and HG-884) to 47.67 days (RGC-1031). Plant Height was between 114.47 cms (Gourishankar-15) and 95.67 cms (Gourishankar-9). Variety Gourishankar-15 and RGC-936-1-5-1 recorded highest and lowest number of branches per plant respectively and (RGC-1031) was non-branching. Pods per plant were more in variety RGC-936 (91.0) and less in GAUG-13 (72.07). Variety RGC-936-1-5-1 recorded long pod length of 5.80 cms and GAUG-13 recorded shorter pods (5.27 cms). Seeds per pod ranged from 7.80 (RGC-1031) to 6.37 (RGC-936). With respect to test weight, varieties RGC-936 (39.20 grams) and GAUG-13 (32.33 grams) recorded highest and lowest weight respectively. Similarly, Douglas (2005), reported that cultivars in their trial flowered between 35 and 40 days after planting. Significant differences in thousand seed weights between cultivars and it ranged from 27.8 g to 36.6 g and there were significant differences in grain yield of cultivars. Further studies are required to evaluate the genotype/varieties and best management techniques in arid and semi arid environments in order to increase production and quality of grain (Orazio Sortino and Fabio Gresta, 2007).

### Conclusion

Considerable area is under rainfed ecosystem in north eastern part of the Karnataka state and gum guar geno-

types evaluated for the first time in this region performed well and have provided a basic information that there is a hope for guar as an alternate and contingent crop during drought year in this region.

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