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Performance of Different Genotypes of Guar (*Cymopsis Tetragonaloba* (L.) Taub) Under Agro-Climatic Conditions of North Coastal Zone of Andhra Pradesh

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ABSTRACT

Guar (*Cymopsis tetragonaloba(*L.)Taub) known as drought tolerant annual crop having high export value for its edible guar gum powder. The crop is having wider adaptability, to introduce in the non-traditional area a study has been taken up to identify suitable genotype/variety for the local agro-climatic conditions of north coastal zone of Andhra Pradesh. An experiment was conducted at RARS, Anakapalli, Viskhapatnam district. The 20 genotypes viz., RGM-111, RGC-936, G-32, GG-1, G-36, G-37, GAUG-9005, GAUG-9003, HG-56-3, RGC-1002, RGC-986, RGM-112, G-16, G-42, RGC-1025, G-39, G-28, G-3, G-4 and G-5 was studied with 2 replications in RB Design for the vegetative growth, seed yield and seed quality. The parameters like plant height, number of branches per plant, days to 50% flowering, number of days taken to maturity, number of pods per plant, number of seeds per pod and seed yield per hectare were observed. Similarly, the observations were recorded for the purpose of gum powder for their quantitative characters viz., weight of the endosperm, weight of non-endosperm, weight of gum at semi solid state, recovery percentage of endosperm and weight of the gum powder from the unit of the seed sample. Among the genotypes, the highest seed yield of 937.98 Kg/ha in the genotype RGM-111 followed by GG-32 (627.67 Kg/ha) which is on par with the genotype RGC-936 (624.97 Kg/ha) was recorded. The significant highest weight of the endosperm 30.25g in RGC-986 followed by RGM-111 (28.75 g) was recorded. Similarly, the significant highest weight of gum powder 25.40 g in RGM-111 followed by RGC-986 (24.90g) was recorded. Further it is concluded that for the seed yield of the genotypes RGM-111 and RGC-93 and for the recovery percentage of endosperm and also for the weight of the gum powder the genotype RGM-111 and RGC-986 is found superior for guar cultivation in the local agro-climatic conditions of North Coastal Zone of Andhra Pradesh.

Key words : Agro Climatic, Genotypes of Guar.

Guar (*Cymopsis tetragonaloba(*L.)Taub) known as a drought tolerant annual crop grown mostly in north-western state viz., Rajasthan, Gujarat, Haryana, Punjab and different parts of UttarPradesh. The seed is having high export value for its edible guar gum content by exporting guar seed. India is getting foreign exchange of Rs. 1,000 to 2000 crores of income every year. The crop is having drought tolerance and wider adaptability. With an objective to identify a suitable variety for the local agro-climatic conditions of North Coastal zone of Andhra Pradesh a study was taken up at Regional Agricultural Research Station, Anakapalli, Visakhapatnam of Andhra Pradesh. A total of 20 genotypes of Guar collected from the North –West region of the country were studied for their suitability, seed yield and quality of seed for gum under local agro-climatic condition of Andhra Pradesh.

MATERIAL AND METHODS

The experiment was conducted during the year 2007 and 2008 in the local agro-climatic condition of North Coastal Zone of Andhra Pradesh at Regional Agricultural Research Station, Anakapalli, Visakhapatnam dist of Andhra Pradesh. The soil at the experimental station is brown sandy loam soils with pH of 6.2, available nitrogen 250 kg ha^{-1} , phosphorous 35 to 40 Kg ha^{-1} and potassium of 150 Kg ha^{-1} and organic carbon of 0.52%. The 20 genotypes that are cultivated in the North West region of India are collected and the seeds are sown at a spacing of 30 x 10 cm in each plot. The crop sowing has been taken up in the second fort night of September during both the years of study. The genotypes are RGM-111, RGC-936, G-32, GG-1, G-36, G-37, GAUG-9005, GAUG-9003, HG-56-3, RGC-1002, RGC-986, RGM-112, G-16, G-42,

RGC-1025, G-39, G-28, G-3, G-4 and G-5 were evaluated in the experiment. The basal application FYM@ 5.0 ton/ha and N, P, K @ 20 Kg, 50 Kg, 50 Kg per hectare were applied respectively. The potassium and phosphorus are applied as basal application and nitrogen in two split doses one at basal and another at 30 days after sowing. One irrigation is given immediately after sowing of the crop and it was maintained free of diseases and pest throughout the crop growth period. The data was recorded for the vegetative and productive growth parameters viz., plant height, number of branches per plant, days to 50% flowering, number of days taken to maturity, number of pods per plant, number of seeds per pod and seed yield per hectare. Similarly, the seeds of each genotype observations were recorded for the purpose of gum powder for their quantitative characters viz., weight of the endosperm, weight of non-endosperm, weight of gum at semi solid state, recovery percentage of endosperm and weight of the gum powder from the unit of the seed quantity. The 20 genotypes as treatments with two replications in a Randomized Block Design was taken up in both years of study and the pooled data was analysed by standard statical analysis as stated by Panse and Sukhatme (1978).

RESULTS AND DISCUSSION

The guar *(Cymopsis tetragonaloba* (Taub) L.) with 20 genotypes studied for their growth, seed yield and seed quality parameters

Table 1. Performance of different genotypes of Guar (*Cymopsis tetragonaloba* L.) for their growth and yield characters studied under agro-climatic conditions of North Coastal Zone of Andhra Pradesh.

Genotype	Growth and yield parameters						
	Plant height (cm)	Number of Branches/ Plant (No)	Days to 50% Flowe-ring	Number of Days taken for maturity	Number of Pods/ plant	Number of Seeds/ pod	Seed yield (kg/ha)
RGM-111	115.32	6.84	39.67	77.09	58.34	9.91	937.98
RGC-936	67.67	5.34	32.83	80.50	39.17	7.35	624.97
GG-32	71.30	4.17	32.00	82.80	38.76	6.67	627.67
GG-1	68.27	4.88	41.16	83.15	43.81	6.40	585.25
GG-36	69.00	5.85	39.67	86.30	42.67	6.09	583.75
GG-37	66.67	4.68	36.81	84.30	41.96	6.60	544.67
GAUG-9005	64.82	5.49	32.67	90.00	39.00	5.77	597.25
GAUG-9003	66.15	4.83	36.17	90.65	40.64	6.78	601.09
HG-56-3	64.67	4.77	32.50	94.00	38.15	6.69	613.09
RGC-1002	65.80	6.17	36.42	83.00	35.65	7.24	605.40
RGC-986	71.67	6.56	33.00	82.30	33.16	6.49	599.80
RGM-112	72.84	5.80	34.84	82.70	30.51	6.42	592.75
GG-16	70.00	6.00	33.34	85.30	34.01	6.39	588.59
GG-42	72.84	5.83	36.37	81.40	40.64	5.70	588.00
RGC-1025	67.82	4.84	40.75	81.30	36.17	5.77	616.00
GG-39	66.67	4.68	38.75	80.30	36.67	6.55	586.19
GG-28	71.84	4.83	36.40	82.70	37.34	6.90	572.75
GG-3	71.67	5.49	33.50	82.80	37.99	5.78	611.25
GG-4	68.67	5.50	33.90	82.30	38.14	5.73	578.67
GG-5	75.50	5.34	39.95	85.50	38.49	5.79	593.59
SE(d)	0.98	0.29	5.57	1.31	4.37	0.17	3.70
CD at 5%	2.07	0.61	N.S.	2.77	9.23	0.35	7.80

Table 2. Performance of different genotypes of Guar (*Cymopsis tetragonaloba* L.) for the quality parameters of seed and gum powder studied under agro-climatic conditions of North Coastal Zone of Andhra Pradesh.

Genotype	Seed quality parameters				
	Weight of the Endosperm (g)	Weight of Non-endosperm (g)	Recovery percentage of endosperm (%)	Weight of gum at semi solid state (g)	Weight of gum powder (g)
RGM-111	28.75	21.50	59.50	177.65	25.40
RGC-936	25.15	22.75	49.50	137.70	21.75
GG-32	18.00	24.50	35.00	108.56	16.05
GG-1	21.80	18.50	41.50	126.30	19.85
GG-36	21.65	17.50	44.00	145.46	19.96
GG-37	26.50	11.00	48.25	140.46	19.85
GAUG-9005	23.50	15.90	47.00	168.95	23.10
GAUG-9003	20.45	19.60	40.15	138.30	19.00
HG-56-3	24.50	21.05	48.50	165.76	23.50
RGC-1002	24.00	11.30	47.80	162.90	22.20
RGC-986	30.25	19.00	50.50	176.60	24.90
RGM-112	19.05	25.15	37.70	127.96	17.00
GG-16	26.00	12.00	50.50	170.90	23.70
GG-42	24.75	15.50	47.00	165.85	23.96
RGC-1025	25.00	14.55	49.50	147.00	21.90
GG-39	18.75	24.55	37.00	125.20	17.30
GG-28	15.76	24.75	31.50	153.05	21.10
GG-3	22.50	21.50	45.00	151.15	20.65
GG-4	21.75	24.20	41.50	140.80	19.20
GG-5	23.50	20.75	46.50	139.90	19.26
SE(d)	0.57	0.27	0.31	0.25	0.54
CD at 5%	1.21	0.57	0.67	0.54	1.13

under local agro-climatic conditions of North Coastal Zone of Andhra Pradesh and the results were presented and discussed here under.

Growth and Development

The study for the evaluation of genotypes for their growth and developmental characters has been revealed that there are significant differences were observed for the characters plant height, number of branches per plant, number of days taken for maturity, number of pods per plant, number of seeds per pod, seed yield per hectare among the 20 genotypes taken up for the present study (Table-1).

Among the genotypes studied the highest plant height of 115.32 cm in the genotype RGM-111 followed by GG-5 (75.5cm) and the lowest of 64.67cm in the genotype HG-56-3 was recorded. The significant highest number of branches per plant of 6.84 in RGM-111 followed by 6.56 in RGC-986 and the lowest of 4.17 in GG-32 was recorded. The non- significant difference were observed for their character number of days to flowering of 32.00 days in the GG-32 followed by GAUG-9005(32.67) but the highest of 41.16 days was recorded in the genotype GG-1. The significant lowest number of days taken for maturity of pods of 77.09 days in the genotype RGM-111 followed by GG-39(80.30), RGC-936(80.50) and the highest of 94.00 days was recorded in the genotype HG-56-3. The similar results in respective phenotypic variation based on genotypic constitution for their quantitative

characters in guar was also reported by Sanghi A.K *et al* (1964) and Meharaotra N *et al* (1980).

The number of pods per plant, number of seeds per pod and seed yield showed significant variation for the above characters in guar. Among the genotypes, the significant highest number of pods per plant of 58.34 in RGM-111 followed by GG-1(43.81) and the lowest in RGM-112(30.51) was recorded. Similarly, the significant highest number of seeds per pod of 9.91 in the genotype RGM-111 followed by RGC-936(7.35) and the lowest of 5.70 was recorded in genotype GG-42. However, among the genotypes the highest seed yield of 937.98 Kg/ha in the genotype RGM-111 followed by GG-32 (627.67 Kg/ha) which is on par with the genotype RGC-936 (624.97 Kg/ha) and the lowest of 572.75 Kg/ha was recorded in the genotype GG-28. The highest seed yield in the genotype RGM-111 might be due to additive factors like highest plant height, more number of branches per plant, more number of pods per plant and more number of seeds per pod might have resulted in increase of the yield. The similar results are also reported by Lakshmi Kalyani, D (2012) and Jain SK and Patel PR (2012).

Seed and gum powder

The significant variation for the characters, weight of the endosperm(g), weight of non-endosperm(g), recovery percentage of endosperm(%), weight of the gum at semi solid state (g) and weight of the final gum powder (g) of seed quality parameters of guar was recorded. Among the genotypes studied, the significant highest weight of the endosperm 30.25g in RGC-986 followed by RGM-111(28.75 g) and GG-37(26.5 g) and the lowest of 15.76g was recorded in the genotype GG-28. Similarly, the highest weight of non-endosperm of 25.15g in RGM-112 and the lowest in GG-37 of 11.00 g was recorded. However, the recovery percentage of endosperm was highest in RGM-111 of 59.5 followed by RGC-986 (50.5) and the lowest of 31.50% was recorded in genotype GG-28. The significant highest weight of gum at semisolid state of 117.65g in RGM-111 followed by 176.6g in RGC-986 and the lowest of 126.30g in GG-1 was recorded. Similarly, the significant highest weight of gum powder 25.40g of RGM-111 followed by RGC-986 (24.90g) was recorded. The above recovery of gum powder was obtained from the unit weight of the seed sample (Table-2). The similar results were also reported by Fabio Gresta *et al* (2013).

From the above study, it is concluded that for the yield of the genotypes RGM-111 followed by RGC-936 and for the recovery percentage of endosperm and also for the weight of the gum powder the genotype RGM-111 followed by genotype RGC-986 are found suitable for guar cultivation in the local agro-climatic conditions of North Coastal Zone of Andhra Pradesh.

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