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RESEARCH ARTICLE

STUDIES ON SUITABILITY OF GROUNDNUT GENOTYPES IN SUMMER AND RAINY SEASONS FOR RIVERINE TRACT OF UTTAR PRADESH

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ABSTRACT

An experiment was laid out during summer season of 2006-07 and rainy season of 2006-07 at Regional Research Station, Mainpuri, C.S. Azad University of Agriculture and Technology, Kanpur. The experimental soil was sandy loam with poor fertility status. The seventy five genotypes of groundnut were tested. The main objective was to find out the suitable genotypes for cultivation during summer season. The secondary objective was to work out the magnitude of yield reduction between summer season and rainy season cultivated groundnut. Among the tested genotypes in summer season Co1 registered significantly highest pod yield of groundnut by 35.41 q/ha followed by ICGS 37 (25.00 q/ha), ICGS 5 (25.00 q/ha), ICGS 76 (25.00 q/ha), ICGS 11 (25.00 q/ha), GG7 (25.00 q/ha), S206 (25.00 q/ha) and Tirupati 3 (25.00 q/ha). The cultivars TG 26, M 157, NRCG 3498, PR 1 and R 9251 also produced the pod yield by 22.91 q/ha, 20.83 q/ha, 20.83 q/ha, 20.83 q/ha and 20.83 q/ha, respectively, during summer season. During rainy season the aforementioned genotypes also give better yield. All the genotypes reduced the pod yield during summer season as compared to rainy season. The magnitude of yield reduction was recorded from 1.60 per cent to 36.64 per cent.

INTRODUCTION

The northern belt of alluvial of Uttar Pradesh, India, having loamy sand, sandy loam, sandy clay loam and light loam texture is ideal for rainy season groundnut cultivation. In early, 1980's groundnut was grown in U.P. on 0.30 million ha with production of 0.19 million tones. Since then both area and production have shown a steady decline due to various reasons. In 2002-03 the groundnut area was reduced to 0.09 million ha with a total production of 0.06 million tone and an average productivity of 600 kg/ha. Effort to arrest this decline in area and production did not succeed due to various biotic and economic reasons (Singh, 2004 and Singh, 2005). A strong need was felt to develop a suitable technology for groundnut cultivation under moisture stress condition to revive groundnut in state. Since the main function of National Agricultural Research Project, Mainpuri was to lead the groundnut research, the scientific team of project started the work on summer groundnut. International Crop Research Institute for Semi – Arid Tropics (ICRISAT), Patancheru provided 29 improved groundnut genotypes for evaluation during summer season in 1998. Genotype *ICGV 93468* of ICRISAT (now *AVTAR*) and *Dh 86* of UAS, Dharwad gave very good performance during summer season and at initial stage both cultivars gave more than 20 q/ha pod yield after 85-90 days of planting. Due to high yield potential, low incidence of insect, pest and diseases, better survival under moisture stress condition, early maturity and thermo-tolerance, *ICGV 93468* (*AVTAR*) and *Dh 86* were

considered safe for farmers. On farm trials were initiated in summer season of 2001, *Dh 86*, *ICGV 93468* yielded 35-40 q/ha, this was the first unprecedented success for dissemination and diffusion of groundnut during summer season in Uttar Pradesh. Thus, the area under summer groundnut cultivation increased from scratch in 2001 to > 4.0 lakh ha during 2018 through farmers to farmers spread. The farmers of groundnut growing tract have demanded for diversification in groundnut genotypes to fetch the better yield and market value. For diversification in groundnut genotypes, the seed of groundnut cultivars was collected from different research stations of India and tested their suitability at Regional Research Station, Mainpuri (U.P.) for both summer and rainy season under edaphic and pedological conditions. The comparison of yield level of different genotypes between rainy and summer season was also the subject matter of this study.

MATERIALS AND METHODS

The present study was under taken during summer season of 2006 and 2007 and rainy season of 2006 and 2007 at Regional Research Station, Mainpuri, C.S. Azad University of Agriculture and Technology, Kanpur. The experimental soil was sandy loam, having pH 8.5, organic carbon 0.45%, total nitrogen 0.04%, available phosphorus 10 kg/ha and available potassium 278 kg/ha, thus, the nutrients of experimental soil were analysed low in organic carbon, total nitrogen, available phosphorus and high in available potassium. The pH was determined by Electrometric glass electrode method (Piper,

1950), while organic carbon was determined by Colorimetric method (Datta, *et al.*, 1962). Total nitrogen was analysed by Kjeldahl's method as discussed by Piper (1950). The available phosphorus and potassium were determined by Olsen's method (Olsen *et al.*, 1954) and Flame photometric method (Singh, 1971), respectively. Seventy five varieties of groundnut were collected from different research station of India and tested (listed in Table 1). The groundnut varieties were planted in 13th March and harvested on 16th June after 96 days of seeding during both experimental season of summer. Similarly in rainy season the crop was planted in 25th June and harvested 10th October after 107 days of seeding during both *Kharif* season as suggested by Singh (2004), Singh (2005), Singh (2006) and Singh (2007). The crop was fertilized with 20 kg N + 30 kg P₂O₅ + 45 kg K₂O + 200 kg gypsum/ha. The irrigations were given at 20, 35, between 50-55 and between 70-75 days of seeding. The crop was harvested on the residue moisture of irrigation given at 70-75 days after seeding as suggested by Singh (2004), Singh (2005), Singh (2006) and Singh (2007). During rainy season the irrigations were given as and when required. The recommended agronomical practices were followed as suggested by Singh (2004). The experiments were under taken in RBD with three replication. The experimental data of pooled years were statistically analysed as suggested by Gomez and Gomez (1984).

RESULTS AND DISCUSSION

The pooled data of two years were analysed and reported in Table 1 and discussed here under appropriate heads.

Pod yield of groundnut during summer season: Among the different genotypes, tested during summer season, *Co1* cultivar registered significantly higher pod yield by 35.41 q/ha followed by *ICGS 37* (25.00 q/ha), *ICGS 5* (25.00 q/ha), *ICGS 76* (25.00 q/ha), *ICGS 11* (25.00 q/ha), *GG 7* (25.00 q/ha), *S 206* (25.00 q/ha) and *Tirupati 3* (25.00 q/ha). The cultivars *TG 26*, *M 157*, *NRCG 3498*, *PR 1* and *R 9251* also produced the pod yield by 22.91 q/ha, 20.83 q/ha, 20.83 q/ha, 20.83 q/ha and 20.83 q/ha, respectively, during summer season. The other tested genotypes were failed in production of expected pod yield. The results display that the better yield in aforementioned genotypes was due to suitability of climatic condition, resistant against to the thermal environment and harsh condition. Under this situation these varieties had maintained better source-sink relationship. It means amount of dry matter or photosynthates produced by source organs translocated towards sink organ (economic part) and produced higher pod yield. The sowing of aforementioned cultivars during summer season had higher number of pods/plant means it possessed high sink capacity to utilized the photoassimilates translocated from source. These results are commensurable to the findings of Panwar *et al.* (1986), Shrivastava and Bharadwaj (1986), Pachpor and Shete (2010), Singh *et al.* (2015) and Singh *et al.* (2016).

Pod yield of groundnut during rainy season: During rainy season the order of better genotypes in term of production was *Co 1* (37.90 q/ha) > *ICGS 37* (25.40 q/ha), *ICGS 5* (25.40 q/ha), *ICGS 11* (25.40 q/ha), *ICGS 76* (25.40 q/ha), *GG 7* (25.40 q/ha), *S 206* (25.40 q/ha), *Tirupati 3* (25.40 q/ha) > *TG 26* (23.32 q/ha), *NRCG 6155* (23.32 q/ha) > *M 197* (21.25 q/ha), *NRCG 3498* (21.25 q/ha), *PR 1* (21.25 q/ha) and *R 9251* (21.25 q/ha). These genotypes produced significantly higher pod yield in comparison to all other tested genotypes.

Table 1. Yield of different genotypes of groundnut during summer and rainy season (pooled data of two season)

S. N.	Variety	Yield (q/ha)		% decrease over rainy season
		Summer season	Rainy season	
1.	ALR 2	16.66	17.08	2.52
2.	ALR 3	8.33	8.75	5.04
3.	ALR 1	6.25	6.66	6.56
4.	AK 12-24	4.17	4.58	9.83
5.	B 95	11.45	12.29	7.33
6.	BG 3	8.33	8.75	5.04
7.	BAU 19	5.20	5.62	8.07
8.	BAU 13	4.17	4.58	9.83
9.	Co 1	35.41	37.90	7.03
10.	CSMG 84-1	8.33	8.75	5.04
11.	Chitra	4.17	4.58	9.83
12.	Chico	4.17	4.58	9.83
13.	CSMG 884	No seed formation		
14.	DRTG 12	12.50	12.90	3.20
15.	DSG 1	4.17	4.58	9.83
16.	Dh 8	13.54	13.95	3.02
17.	DRG 17	13.53	13.95	3.10
18.	DRG 101	No seed formation		
19.	ICGV 88448	4.17	4.58	9.83
20.	ICGV 86590	16.66	17.08	2.52
21.	ICGV 86325	12.50	12.95	3.60
22.	ICGS 37	25.00	25.40	1.60
23.	ICGS 5	25.00	25.40	1.60
24.	ICGS 76	25.00	25.40	1.60
25.	ICGV 86031	4.17	4.58	9.83
26.	ICGS 11	25.00	25.40	1.60
27.	ICG (FDRS) 10	12.50	17.08	36.64
28.	ICG (FDRS) 4	8.33	8.74	4.92
29.	Fe ESG 8	12.50	12.91	3.28
30.	Fe ESG 10	16.66	17.08	2.52
31.	GAUG 10	4.17	4.58	9.83
32.	GG 13	14.58	15.00	2.88
33.	Girnar 1	No seed formation		
34.	GG 12	13.54	13.95	3.02
35.	GG 3	15.62	16.03	2.62
36.	GG 11	8.33	8.75	5.04
37.	GG 20	10.42	10.83	3.93
38.	GG 7	25.00	25.40	1.60
39.	Gangapuri 16	No seed formation		
40.	JSP 19	7.29	7.70	5.62
41.	K - 134	12.08	12.38	2.48
42.	Kadri 2	7.29	7.70	5.62
43.	Karad 4-11	1.04	1.08	3.84
44.	M 335	4.17	4.58	9.83
45.	M 145	4.17	4.58	9.83
46.	M 13	4.17	4.58	9.83
47.	M 522	16.66	17.08	2.52
48.	M 197	20.83	21.25	2.01
49.	NRCG 6450	16.66	17.08	2.52
50.	NRCG 3498	20.83	21.25	2.01
51.	NRCG 7085-1	16.66	17.08	2.52
52.	NRCG 162	17.70	18.12	2.37
53.	NRCG 6155	19.78	23.32	17.89
54.	NRCG 2588	12.50	12.91	3.28
55.	PR 1	20.83	21.25	2.01
56.	Punjab 1	12.50	12.91	3.28
57.	R 8808	12.50	12.90	3.20
58.	R 9251	20.83	21.25	2.01
59.	RG 141	15.62	16.03	2.62
60.	RS 1	12.50	12.91	3.28
61.	RS 138	5.20	5.62	8.07
62.	S 230	2.08	2.12	1.92
63.	SB XI	13.54	13.95	3.02
64.	SP 250 K	12.50	12.91	3.28
65.	S 206	25.00	25.40	1.60
66.	TKG 19 A	10.41	10.83	4.03
67.	T 64	4.17	4.58	9.83
68.	TG 26	22.91	23.32	1.78
69.	TG 32	8.33	8.75	5.04
70.	TAG 24	13.54	15.51	14.54
71.	TG 3	12.50	12.91	3.28
72.	TG 17	8.33	8.75	5.04
73.	Tirupati 3	25.00	25.40	1.60
74.	UF 70-103	12.50	12.90	3.20
75.	VRI 3	9.89	10.31	4.24
	SE (m±)	2.32	2.43	-
	CD 5%	4.54	4.76	-

Thus, it is proved from the experimental results that the poor yielder cultivars did not suit for cultivation in the study area.

Magnitude of yield reduction between summer and rainy season groundnut: Results displayed that all the genotypes reduced the pod yield during summer season as compared to rainy season. The magnitude of yield reduction was recorded from 1.60 per cent to 36.64 per cent. The minimum reduction was noted by 1.60 per cent in *ICGS 37, ICGS 5, ICGS 11, GG 7* and *Tripurati 3*, while maximum reduction noted in *ICG (FDRS) 10* by 36.64 per cent.

Conclusion

The farm families residing in the riverine tract of Uttar Pradesh, where groundnut cultivation is in vigour may be advocated for cultivation of *Co 1, ICGS 37, ICGS 5, ICGS 76, ICGS 11, GG 7, S 206, Tirupati 3, NRCG 6155, TG 26, M 157, NRCG 3498, PR 1 and R 9251* for obtaining maximum pod yield during both summer and rainy season.

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