SHORT COMMUNICATION

Adaptability of Some Groundnut Breeding Lines under Residual Moisture of Paddy Fallow

SK Bera*, P Dash and Suraj Pal
Out-reach Centre of National Research Centre for Groundnut, 38-Dharmavihar, Bhubaneswar-751030, Orissa

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In India, the average productivity of groundnut in post-rainy season is fairly high (1500 kg/ha) and quite stable but its contribution to National groundnut basket is only 32 percent. Pre-*rabi*/*rabi* groundnut, grown either on residual moisture situation or with minimal irrigation after harvest of *kharif* rice is one of the most remunerative cash crop in the state of Orissa. Groundnut cultivation under residual moisture condition of paddy fallows in the state has touched the area of 0.2 million hectare with an average productivity of 2 tonnes/hectare (Ghosh, 1995). However, biggest problem towards productivity of groundnut under paddy fallows is non-availability of improved location specific variety suitable for existing cropping pattern and quality seed materials. Hence, merit to assess the performance and adaptability of groundnut genotypes towards further pushing up and sustaining the groundnut productivity.

Thirty-nine water use efficient and short duration groundnut varieties received from ICRISAT, Patancheru, Andhra Pradesh and local variety, AK-12-24 as check have been used in the present study. Experiments were conducted at the farm of Central Rice Research Institute, Cuttack, Orissa during post-rainy season after harvest of *kharif* rice in the year 1999, 2000 and 2001. Forty genotypes were sown in Randomized Block Design, replicated thrice during first week of January every year. Each genotype was sown in five lines of five meters length with 45 x 10 cm spacing between and within lines, respectively. Recommended cultural practices for groundnut were followed for conducting experiments in every year. Observation on plant height, number of primary branches, biological yield, pod yield per plant, total pods per plant, matured pods per plant, shell thickness kernel yield per plant, hundred kernels weight, pods length and breadth, kernel length and breadth were recorded on ten randomly selected plants from each plots at harvest. Harvest index based on kernel yield, pod length and breadth ratio and kernel length and breadth were calculated. Pod yield per plant was utilized to work out stability parameters following Eberhart and Russell (1966).

The joint regression analysis (Table 1) revealed that genotypes and environment mean sum of square for pod yield per plant were significant indicating wide variability among the genotypes for expression of the character and warrant further studies. Yadav and Kumar (1979) and Kumar *et al.* (1984) observed similar results for hundred pods mass and shelling percent, the two yield contributing characters in different set of genotypes. Significant genotype x environment (linear) interaction might be responsible for high (linear) adaptation in relation to yield contributing characters. The variance due to pooled deviation (nonlinear) was also significant reflected considerable genetic diversity in the material (Perkins and Jinks, 1968). Such nonlinear deviation may be of practical value to construct and test the utility of multiple regression models to know critically the complex mechanism of adaptation. A variety is likely to be stable over different environments if it shows high mean value (above average performance), unit or less than linear regression coefficient (bi) with lowest deviation (non-significant) from the linear regression (bi). Twenty-five genotypes (Table 2) either registered at per or higher pod yield per plant in comparison to check, while only five genotypes viz, ICGV-91112, ICGV-92215, ICGV-86607, ICGV-88409 and ICGV-91124 produced significantly higher pod yield per plant than check. Out of these, ICGV-92215 could be promising and stable in any environment for its lower S^2d_i nearer to unit b_i values. On the other hand

* *Present Address: National Research Centre for Groundnut, Post Box-5, Ivnagar Road, Junagadh-362001, Gujarat*

Table 1. ANOVA for pod yield/plant (g) in groundnut

Source of variation	d.f	M.S.S
Genotype (G)	39	8.67**
Environment (E)	2	202.22**
G x E	78	4.79**
E (Linear)	1	404.45**
G x E (linear)	39	4.93**
Pooled Deviation	40	4.53**
Pooled error	234	2.55**

Table 2. Estimates of stability parameters based on three environments for pod yield/plant (g)

Genotypes	Mean	B_i	S^2d_i
ICGV-91129	9.16	0.74	10.79**
ICGV-92195	7.22	0.95	8.48**
ICGV-93382	9.36	0.19	-0.85
ICGV-91146	9.62	0.86	-0.33
ICGV-91131	9.47	1.21	-0.71
ICGV-92234	6.80	1.33	-0.20
ICGV-92199	9.26	0.68	1.78
ICGV-92229	6.40	0.06	19.23**
ICGV-87160	9.42	1.02	6.40
ICGV-91112	10.93	2.77* *	-0.10
ICGV-92222	9.89	1.89	0.26
ICGV-91114	7.56	0.65	0.28
ICGV-87354	8.71	1.78	16.55**
ICGV-92198	8.64	1.35	-0.47
ICGV-91117	9.98	1.55	17.02**
ICGV-92215	11.56	1.25	0.42.
ICGV-86031	9.07	1.37	0.87
ICGV-93379	8.58	0.47	2.09*
ICGV-87358	9.36	1.41	5.58**
ICGV-92196	9.26	1.20	2.80**
ICGV-91151	9.49	1.69	4.39**
ICGV-86607	11.16	-0.19	0.34
ICGV-93407	7.20	0.83	21.24**
ICGV-93373	8.47	1.34	-0.85
ICGV-88398	7.60	0.00	-0.85
ICGV-92224	4.09	0.00	1.57
ICGV-93396	7.82	0.56	9.27**
ICGV-88409	11.10	-0.01	7.97**
ICGV-86590	7.90	0.01	1.57
ICGV-92206	7.76	0.55	-0.78
ICGV-92196	9.02	1.10	4.91**
ICGV-93438	9.53	1.65	3.57**
ICGV-91123	7.16	0.21	-0.47
ICGV-86707	7.82	1.16	-0.85
ICGV-92226	8.64	1.68	0.47
ICGV-92269	9.64	2.05	-0.85
ICGV-86742	6.27	0.72	-0.24
ICGV-91124	10.76	2.04	-0.77
ICGV-86754	7.84	1.72	6.25**
AK-12-24	9.42	0.09	1.67
Mean	**8.73**	**1.00**	
SE of mean (±)	**1.50**	**0.66**	

ICGV-91112 and ICGV-91124 may be promising for only in favourable environments due to their lower S^2d_i and higher bi values while; ICGV-86607 may be more adaptive poor environment for its lower S^2d_i and negative b_i value (Jatasara and Paroda 1980). In spite of higher pod yield per plant the adaptability of ICGV-88409 was conspicuous due to its significantly higher S^2d_i value. The genotypes, ICGV-92215, ICGV-91112, ICGV-86607 and ICGV-91124 registered appreciable kernel wt per plant and harvest index (Table 3) may be suitable alternative to push further rice based groundnut productivity under residual moisture situation.

Table 3. Pooled mean for seven yield related traits of seven selected genotypes

Genotypes	Pods yield/pl.	Kernel yield/pl (g)	Biological yield/pl (g) (g)	Harvest Index (%)
ICGV -91112	10.93	9.82	26.44	37.15
ICGV -91124	10.76	8.23	24.56	33.51
ICGV -92215	11.56	8.28	26.49	31.24
ICGV-86607	11.16	6.56	26.13	25.10
ICGV-88409	11.10	6.70	35.27	19.00
AK 12-24	9.42	7.97	22.00	36.06
Mean	**10.82**	**7.93**	**26.82**	**30.34**
S. E. of mean (±)	**1.07**	**1.31**	**3.14**	**0.77**

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