

## EVALUATION OF GROUNDNUT FOR KHARIF UPLANDS AND SUMMER RICE FALLOWS

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Groundnut is The most important annual oil seed crop in India as well as in Kerala. Besides being a legume, it can fit well in intercropping, relay cropping and multiple cropping systems of a high production potential. It is being cultivated traditionally in uplands during kharif (May to September) mainly in Palghat district, but there is scope for extending its cultivation to other areas. A non-traditional, but highly potential area for large scale cultivation of this crop is the summer rice fallows (January to April). The efficacy of growing groundnut in the summer rice fallows in rice based cropping system, both in terms of economic return and enrichment of soil fertility, had been amply demonstrated (Sasidhar, 1978; Anon., 1979).

The groundnut varieties now recommended in Kerala are TMV 2 and TMV 7, originally evolved in Tamil Nadu. In recent years, a large number of groundnut varieties have been developed at different research centres. The crop being relatively insensitive to day length with remarkably high level of adaptability, introduction and selection of high yielding varieties developed elsewhere could be expected to yield fruitful results as indicated by Norden (1980) and Reddy (1980).

### Materials and Methods

A widely divergent collection of 93 varieties was subjected to preliminary evaluation in uplands during kharif 1980 and in rice fallows during summer 1981. Based on general adaptability, pod yield and other desirable attributes, 31 varieties including the two recommended varieties TMV 2 and TMV 7 were selected for critical evaluation. They were tested in comparative yield trials in randomised block design with 3 replications in uplands during kharif 1981 and 1982 and in rice fallows during summer 1982 and 1983 at the Agricultural Research Station, Mannuthy. Five varieties TG 14, Spanish Improved, TG 3, Pollachi 2 and EC 35999 were selected as high yielding and more stable in performance with other economic traits. These five promising varieties along with the three standards TMV 2, TMV 7 and JL 24 were further tested in multi-locational trials in farmers fields in rice fallows and uplands. This comprised of 5 locations during summer 1983 in rice fallows and 6 locations during kharif 1983 in uplands of Palghat and Trichur districts. The data at each of the seasons and locations were analysed statistically. Pooled analysis was also done.

## Results and Discussion

All the 93 varieties put to preliminary evaluation in uplands and rice fallows had come up satisfactorily showing the remarkably high level of adaptability of the crop as stated by Prasad and Kauf (1980). The performance of the varieties varied considerably within and between the seasons as reported by Dorairaj (1980).

The varieties differed significantly in pod yield, haulm yield, duration and quality characters during kharif and summer (Table 1, 2). Wide variability in economic traits among varieties as seen in the present trials was reported by Jaswal and Gupta (1967), Paul (1978), Natarajan *et al.* (1978), Patra (1980), Rao (1980) and Anon. (1982). The varietal performance also varied between the seasons and years. This confirms the observation made by Dorairaj (1980) that the performance of one and the same variety varies from place to place and from season to season.

In the uplands during kharif 1981, TG 14 ranked first in dry pod yield followed by Spanish Improved, TG 17, EC 119704 and EC 112027 whereas during 1982 the first rank was held by EC 119704 closely followed by TG 14, Spanish Improved and Big Japan. TG 3 was the highest yielder in rice fallows during summer 1982 and 1983. The other high yielders were Pollachi 2, Spanish Improved, TG 14 and EC 35999. For fresh haulm yield, the maximum in all the trials was given by ICG 3859. The highest pod yield was registered by TG 14 (3.24 t/ha) followed by Spanish Improved (3.11 t/ha), TG 3 (2.91 t/ha), EC 119704 (2.78 t/ha) and Pollachi 2 (2.73 t/ha) in the pooled analysis. Most of the varieties yielded a large quantity of green haulms which can efficiently be utilized as quality fodder/organic manure. In fresh haulm yield, the highest pooled mean was given by ICG 3859 (18.57 t/ha) followed by AH 6915 (13.60 t/ha), Big Japan (13.38 t/ha) and S-7-5-13 (13.27 t/ha). The duration upto maturity ranged from 103 to 131 days and from 93 to 117 days in uplands and rice fallows respectively. The duration, in general, was more by about a week during kharif than in summer.

M 13 during kharif and EC 36892 during summer had the highest 100 pod weight of 113 g and 142 g respectively while the lowest was recorded by Pollachi 2 and KG 61-240 with 60 g and 71 g respectively in the two seasons. The shelling percentage ranged from as low as 52% for Gangapuri to as high as 70% for Jyothi in uplands during kharif while it ranged from 57% for Big Japan to 81% for KG 61-240 in summer rice fallows. During kharif, the first and second ranks for oil content were held by AH 6915 and S-7-5-13 whereas in summer, the varieties interchanged their ranks. TMV 10 ranked third in both the seasons. Oil content was the lowest in EC 36892 during kharif and M 13 during summer. M 13 recorded the highest protein content during kharif and summer followed by TG 17 during kharif and EC 36892 and TG 17 in summer. The lowest protein content at both the seasons was recorded by TMV 10. Generally, the varieties with higher oil content tend to be lower in protein content as reported by Shany (1979).

in summer rice fallows TG 3 ranked top in pod yield and was superior to the recommended varieties, TMV 2 and TMV 7 (Table 3, 4). The second rank was held by TG 14 at three locations and Spanish Improved at two locations. The pooled analysis also brought out the superiority of TG 3 over all the other varieties. TG 14, Pollachi 2, Spanish Improved and EC 35999 were on par, of which TG 14 was significantly superior to the recommended variety, TMV 2. The first, second and third ranks were taken by TG 3, TG 14 and Pollachi 2/Spanish Improved,

Out of the six locations in kharif uplands, TG 14 was the highest yielder at four locations while at the remaining two locations TG 3 was the best yielder. Spanish Improved at three locations, TG Mat two locations and TG 3 at one location ranked second. All these three varieties were superior to the recommended varieties at all the locations. The pooled analysis revealed that TG 14 is far better than all other varieties. TG 3 and Spanish Improved were on par and superior to the standard varieties closely followed by TG 14 and TG 3 and Spanish Improved.

TG 3 is a mutant variety derived from Spanish Improved and TG 14 is the recombinant from a cross between two mutants. Both the varieties were developed at the 8ARC, Trombay and are commercially cultivated in Gujarat, Maharashtra and Karnataka. Spanish Improved is an exotic variety recommended in Andhra Pradesh, Maharashtra and Karnataka (Table 5). All the three varieties have given outstanding performance in the various trials. Such varieties which are more or less stable in their higher yield performance are of great value since groundnut production suffers from proverbial instability (Prasad and Kaul, 1980). The high yield potentials of these varieties were reported earlier by Patil (1978), Anon. (1981 and 1982).

### Summary

A widely divergent collection of 93 groundnut varieties was screened to select the best suited variety for the kharif uplands and summer rice fallows. They were evaluated in preliminary trials in uplands as well as in rice fallows. The varieties exhibited wide diversity for important economic traits within and between seasons and many of them were far superior to the recommended varieties. Based on the performance in the preliminary trials, thirty one varieties including the recommended varieties (TMV 2 and TMV 7) were selected for comparative yield trials. They were tested in two seasons each in uplands and rice fallows. The varieties differed in yield and other economic traits in both seasons. The performance of the same variety, in general, varied from upland to rice fallows. TG 14 in uplands and TG 3 in rice fallows were the top ranking varieties. Spanish Improved was found to be a high yielder at both seasons. Five promising varieties were selected and they along with 3 standards were further tested in multi-locational trials at 5 locations in summer rice fallows and 6 locations in kharif uplands. The multi-locational trials further confirmed that TG 14 and TG 3 were the highest yielders in uplands and rice fallows respectively. Spanish Improved was also another high yielder at both seasons.

Table I  
Yield of pod haulm and

Sl. No.	Name of variety	Pod yield dry (t/ha)				Pooled Mean
		Kharif uplands		Summer rice fallows		
		1981	1982	1982	1983	
1	2	3	4	5	6	7
1	EC 21 118	2.76	1.70	2.34	<b>1.66</b>	2.12
2	ICG 3149	2.42	2.27	2.57	1.55	2.20
3	EC 36892	2.78	1.89	2.90	1.71	2.32
4	S 7513	2.39	1.87	2.55	1.72	2.13
5	EC 112027	3.77	1.66	2.95	2.06	2.60
6	B 353	2.68	1.85	1.88	1.58	2.00
7	EC 35999	2.57	2.14	2.92	2.34	2.49
8	EC 1 19704	3.83	3.00	2.63	1.66	2.78
9	AH 691 5	2.27	1.91	2.51	1.56	2.06
10	M 13	2.97	2.31	2.41	1.83	2.38
11	Spanish Improved	4.36	2.69	3.12	2.28	3.11
12	Dh3-30	3.36	1.89	2.71	2.27	2.56
13	Jyothi	2.83	1.90	2.64	1.96	2.34
14	Exotic 6	2.53	1.96	2.64	<b>2.17</b>	2.33
15	TMV 9	3.20	1.84	2.93	2.03	<b>2.50</b>
16	TMV 10	3.04	1.99	<b>2.63</b>	1.82	2.37
17	AK 811	2.97	1.88	2.66	1.92	2.36
18	TMV 2	3.43	2.05	2.38	1.92	2.45
19	KG 61 -240	2.96	1.65	2.58	2.11	2.32
20	TMV 11	<b>2.95</b>	2.41	2.55	1.92	2.46
21	Pollachi 2	3.33	2.06	3.15	2.40	2.73
22	TG 3	3.33	2.45	3.24	2.61	2.91
23	TG 14	4.65	2.99	3.12	2.21	3.24
24	TG 17	<b>3.86</b>	2.36	2.48	1.84	2.71
25	TG 19	3.27	2.04	2.74	2.15	<b>2.55</b>
26	Pollachi 1	3.20	2.31	2.94	1.98	2.61
27	TMV 7	2.59	1.89	<b>1.78</b>	1.87	2.03
28	Gangapuri	2.09	1.81	1.49	1.91	1.83
29	BigJapan	3.01	2.59	<b>2.49</b>	1.62	2.42
30	Co 1	3.42	2.10	2.74	2.12	2.60
31	JL 24	—	2.05	2.55	1.94	2.18
	CD (0.05)	0.706	0.346	0.434	0.234	0.262

duration in 31 lines of groundnut

Haulm yield fresh (t/ha)				Pooled Mean	Duration upto maturity (days)			
Kharif uplands		Summer rice fallows			Kharif uplands		Summer rice fallows	
1981	1982	1982	1983		1981	1982	1982	1983
8	9	10	11	12	13	14	15	16
8.85	10.17	15.41	11.35	11.45	111	103	101	97
15.50	21.13	20.53	17.13	18.57	128	121	105	100
7.07	9.69	14.16	12.32	10.81	126	123	111	105
11.49	12.03	16.88	12.68	13.27	128	128	112	104
7.78	6.81	13.34	10.47	9.60	111	103	96	94
11.54	9.51	8.97	5.76	8.94	109	103	106	100
9.27	11.01	13.66	10.89	11.20	114	110	99	96
13.42	12.09	12.19	10.91	12.15	120	115	112	103
11.70	15.13	16.57	11.02	13.60	122	121	113	105
11.99	10.91	13.44	10.63	11.74	131	127	117	107
14.29	10.65	14.28	11.98	12.80	112	106	99	96
10.18	11.59	14.38	10.31	11.62	112	106	98	96
7.11	9.88	13.13	8.49	9.65	106	103	98	94
11.23	10.37	16.17	9.22	11.75	109	110	95	93
13.65	11.68	9.38	8.09	10.70	112	108	100	95
8.89	9.10	14.78	11.71	11.12	111	108	106	101
11.61	9.22	14.28	8.56	10.92	112	110	102	97
13.98	9.56	9.06	8.94	10.39	115	110	107	100
9.87	8.81	12.50	10.21	10.35	106	106	99	95
13.31	13.41	9.28	8.66	11.16	121	105	109	102
9.29	11.09	15.09	10.56	11.55	109	100	97	94
11.92	10.84	14.91	8.82	11.62	117	105	99	98
14.59	12.73	11.25	9.22	11.95	116	109	106	99
12.73	10.64	11.34	10.12	11.21	118	112	101	100
13.85	8.23	12.81	9.58	11.12	108	108	98	94
8.98	1.164	11.47	8.68	10.19	110	100	100	96
13.80	10.54	14.06	10.01	12.10	108	110	98	94
10.07	14.68	16.25	10.89	12.89	116	116	98	95
11.69	19.49	11.66	10.66	13.38	127	115	110	104
10.56	9.77	7.81	6.58	8.68	112	108	106	99
—	9.07	7.38	6.35	7.60		109	99	99
2.594	2.771	2.906	1.339	1.347	4.3	4.8	2.7	3.0

Table 2  
Quality characters in 31 lines of groundnut

Sl. No.	Name of variety	100 pod weight (g)		Shelling (%)		Oil content (%)		Protein content (%)	
				Kharif/		Kharif/		Kharif/	
		Kharif/	Summer	1981	1982	1981	1982	1981	1982
1	EC 21118	80	82	74	78	46	46	27	25
2	ICG 3859	75	110	73	67	49	49	24	25
3	EC 36892	99	142	61	70	42	43	27	29
4	S-7-5-13	89	103	73	61	53	54	25	26
5	EC 112027	63	90	76	78	47	47	24	23
6	B 353	66	83	76	76	48	49	25	26
7	EC 35999	92	101	77	75	48	47	25	26
8	EC 119704	87	113	74	69	46	47	27	28
9	AH 6915	96	140	76	67	54	53	26	27
10	M 13	113	107	73	69	43	42	32	30
11	Spanish Improved	74	91	74	73	48	48	27	26
12	Dh-3-30	84	87	71	73	48	49	26	25
13	Jyothi	66	103	79	76	51	50	29	26
14	Exotic 6	69	78	76	78	46	48	27	27
15	TMV 9	65	88	76	75	48	47	28	26
16	TMV 10	89	88	75	71	52	52	23	23
17	AK 811	71	86	76	78	48	48	26	27
18	TMV 2	85	108	72	75	48	47	26	25
19	KG-61-240	71	71	78	81	43	47	26	25
20	TMV 11	97	125	70	72	44	43	25	24
21	Pollachi 2	60	83	78	78	45	46	26	25
22	TG 3	90	99	76	73	50	47	25	24
23	TG 14	91	102	75	71	48	47	26	26
24	TG 17	111	121	73	71	48	49	30	29
25	TG 19	81	92	73	73	48	48	27	26
26	Pollachi 1	80	113	74	69	45	45	26	25
27	TMV 7	81	84	78	77	45	48	26	25
28	Gangapuri	63	92	52	69	47	49	27	26
29	Big Japan	76	98	71	57	46	48	29	28
30	Co 1	66	90	77	76	49	50	25	26
31	JL 24	108*	108	77*	74	48*	48	27*	28
	CD (0.05)	1.6	1.4	1.1	1.1	0.8	0.7	1.2	1.1

Relates to kharif 1 982

Table 3

Yield of dry pods (t/ha) in multilocal trials in summer rice fallows

Sl. no.	Locations	TG 14	Spanish Improved	TG 3	Pollachi 2	EC 35999	TMV 2	TMV 7	JL 24	CD (0.05)
1	Agricultural Research Station, Mannuthy	2.42	2.17	2.56	2.43	2.41	1.91	1.98	2.19	1.108
2	Cultivators field at Puthur	2.26	2.37	2.61	2.26	2.25	2.08	1.88	—	2.245
3	Kodassery	2.50	2.37	2.97	2.31	2.38	2.19	2.50	—	2.580
4	Puthukode	2.23	2.39	2.51	2.26	2.29	1.93	1.85	—	1.429
5	Malampuzha	2.95	2.33	3.07	2.43	2.27	2.35	2.07	—	2.415
	Mean	2.47	2.33	2.75	2.34	2.32	2.09	2.05	2.19	2.667

Table 4

Yield of dry pods (t/ha) in multilocal trials in kharif uplands

Sl. no.	Locations	TG14	Spanish Improved	TG 3	Pollachi 2	EC 35999	TMV 2	TMV 7	JL 24	CD (0.05)
1	Agricultural Research Station, Mannuthy	2.41	2.40	2.11	1.64	1.85	1.64	1.63	1.83	3.211
2	Cultivators field at Thrithala	3.53	3.36	3.54	3.07	3.15	2.99	2.86	3.21	4.523
3	„ Vellanikode	2.99	2.60	2.57	2.00	2.10	1.93	1.99	2.31	2.341
4	„ Muthalamada	3.67	3.20	3.05	2.67	2.87	2.56	2.46	2.69	1.538
5	„ Chulliar-1	2.71	2.55	2.64	2.34	2.25	2.02	1.71	2.35	1.818
6	„ Chulliar-2	3.52	3.13	3.17	2.90	2.65	2.59	2.34	2.87	2.658
	Mean	3.14	2.87	2.88	2.44	2.43	2.29	2.17	2.55	1.514

Table 5

Salient features of TG 3, TG 14 and Spanish Improved

Sl. no.	Characters	TG 3	TG 14	Spanish Improved
1	Habit	Bunch	Bunch	Bunch
2	Stature	Semitall	Semitall	Semitall
3	Stem			
	Pigmentation	Absent	Slight	Absent
	Hairiness	Pubescent	Pubescent	Pubescent
4	Days to branching	Early	Early	Early
5	Leaf			
	Petiole pigmentation	Absent	Absent	Absent
	Stipules	Present	Present	Present
6	Days to 50% <b>flowering</b>	28.5	29.3	28.3
7	Flowers	Yellow	Yellow	Yellow
8	Aerial pegging	Low	Medium	Low
9	Peg pigmentation	Absent	Slight	Absent
10	Days to maturity	<b>98-117</b>	99-116	<b>96-112</b>
11	Pods			
	Number per plant	19.1	22.3	24.4
	Constriction	Shallow	Shallow	<b>Shallow</b>
	Size	Medium	Medium	Medium
	Shape	Beaked	Beaked	Beaked
12	100 pod weight (g)	<b>141.5</b>	148.8	138.5
13	100 kernal weight (g)	56.6	64.4	56.0
14	Testa colour	Rose	Flesh	Rose
15	Shelling %	74.5	73.0	73.5
16	Oil content %	48.5	47.5	48.0
17	Protein content %	24.5	26.0	26.5
18	Seed dormancy	Non-dormant	Non-dormant	Non-dormant



സംഗ്രഹം

കേരളത്തിലെ കരഭൂമികളിൽ മഴക്കാലത്തും നെൽപ്പാടങ്ങളിൽ വേനൽക്കാലത്തും കൃഷി ചെയ്യുവാൻ ഏറ്റവും അനുയോജ്യമായ നിലക്കടല ഇനങ്ങൾ ഉരുത്തിരിച്ചെടുക്കുവാൻ വേണ്ടി ഒരു സസ്യപ്രജനന പരിപാടി 1981 *toai-za ffr^rwl* കാർഷിക ഗവേഷണ കേന്ദ്രത്തിൽ പ്രവർത്തിച്ചു തുടങ്ങി. വ്യത്യസ്തമായ 93 ഇനങ്ങൾ മഴക്കാലത്തും വേനൽക്കാലത്തും പരീക്ഷിച്ചു നോക്കിയതിൽ നിന്നും 31 ഇനങ്ങളെ വിപുലമായ താരതമ്യ പഠനത്തിന് വിധേയമാക്കി. പലയിനങ്ങളും ഇപ്പോൾ പ്രചാരത്തിലുള്ള ടി എം വി 2, ടി എം വി 7 എന്നിവയെക്കാൾ വളരെ മെച്ചമാണെന്നു കണ്ടു. മഴക്കാലത്ത് കരഭൂമിയിൽ ടി ജി 14 ഉം വേനൽക്കാലത്ത് നെൽപ്പാടങ്ങളിൽ ടി ജി 3 ഉം പരമാവധി വിളവു തന്നു. മേൻമയേറിയ ഈ ഇനങ്ങളും പ്രചാരത്തിലുള്ളവയും വിവിധ സ്മലങ്ങളിൽ കൃഷി ചെയ്തപ്പോഴും മഴക്കാലത്ത് കരഭൂമിയിൽ ടി ജി 14 ഉം വേനൽക്കാലത്ത് നെൽപ്പാടങ്ങളിൽ ടി ജി 3 ഉം ഏറ്റവും കൂടുതൽ വിളവു നൽകി. സ്പാനിഷ് ഇംപ്രൂവ്ഡ് രണ്ടിടത്തും അടുത്ത മെച്ചമായ നിലവാരം പുലർത്തി. ഈ ഇനങ്ങളും കേരളത്തിലേക്ക് യോജിച്ച വർദ്ധിച്ച ഉൽപ്പാദനശേഷിയുള്ളവയാണെന്നു തെളിഞ്ഞു.

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