

Co. 1. A new high yielding bunch variety of groundnut for Tamil Nadu

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With the object of evolving a dormant high yielding bunch type, crosses were effected between Ah 6279 (bunch type) and TMV. 3 [Spreading type] and a derivative Ah 8254, was identified and evaluated in the different research centres as well as in the farmers holdings both under rainfed and irrigated conditions for a number of years. The yield data indicated that Ah 8254 is widely adaptable and may be grown throughout Tamil Nadu. This culture recorded an average yield of 1031 kg/ha as compared to 897kg/ha for TMV. 9 under rainfed condition. Under summer irrigated condition, it recorded 1748kg/ha as against 1394kg for TMV. 9. The yield increases were 15% and 25% under rainfed and irrigated conditions respectively. In cultivators' holdings Ah 8254 recorded upto 30% increased yield over TMV. 9 under irrigated condition.

In shelling out-turn, it was superior with 74% as compared to 71% of TMV. 9. In oil content also, Ah 8254 (50.4%) excelled TMV. 9. (48.8%) recorded 26% higher oil production per hectare than TMV. 9. It was released as Co. 1 groundnut variety.

Tamil Nadu stands third in the area under groundnut in India. An area of 10.6 lakhs of hectares is raised annually in Tamil Nadu under this commercial crop with a total production of 10.5 lakhs tonnes. The average yield of groundnut in Tamil Nadu is 900Kg/ha under rainfed condition and 1500Kg/ha under irrigated condition. A number of varieties have been released so far for general cultivation. However, constant efforts are being made to improve further the yield potentials by adopting the latest breeding techniques. In this direction, a hybridisation programme was undertaken under All India co-ordinated Research Projects on Oilseeds at Tindivanam to evolve a dormant high yielding bunch variety to replace the existing varieties.

MATERIAL AND METHODS:

The attempts to introduce a bunch type, Ah 6279 possessing more number of pods with medium sized kernels met without success due to erratic behaviour of this genotype. Hence the desirable economic attributes like number of pods and medium sized kernel were proposed for transfer in to the adapted spreading variety TMV. 3, which is longer in duration (120 days) with bold kernels and a dormancy upto 75 days. Crosses were effected using Ah. 6279 as pistil parent while TMV. 3 served as male parent. From the progenies of this cross Ah 6279 + TMV. 3 a high yielding, Ah 8254, with more number of pods and small sized kernels falling under spanish bunch group was identified. This selection was evaluated for its yield potentials

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from 1972 onwards in comparison with the ruling strains pol 2 TMV. 7 and TMV. 9 both under rainfed and irrigated conditions in different trials at Research Stations or Research Centres located throughout Tamil Nadu under multilocation testing programme. When the performance of this selection was found to be superior. It was further subjected to Adaptive Research trials in the cultivators' holdings in all the groundnut growing districts of Tamil Nadu.

RESULTS AND DISCUSSION:

Pod Yield

(a) *Rainfed season*: The yield potential of this selection Ah 8254 was tested under rainfed condition during Southwest monsoon (July-October) from 1972 to 1977 at Tindivanam and Pollachi. In the 12 trials conducted, the mean yield of Ah 8254 was 1031/kg ha as compared to 897 and 880kg/ha for TMV. 9 and POL. 2 respectively. The yield increases were 14.9% and 17.2% over TMV. 9 and POL. 2 respectively (Table 1). This clearly bring out the superiority of Ah. 8254.

(b) *Irrigated summer season*: The performance of this selection was also evaluated under irrigated condition from January to May at different research stations of Tamil Nadu Agricultural University from 1975 to 1977 (Table 1). An average yield of 1748kg/ha was recorded by Ah 8254 as compared to 1394kg in TMV. 9 and 1399kg in POL. 2. The yield increase were 25.4 and 24.2 over TMV. 9 and POL. 2 respectively.

The yield potential of this selection was also tested in adaptive research trials directly by the staff of All India

Co-ordinated Research Project on Oilseeds (Table. 2). In the 28 adaptive research trials conducted in four districts of Tamil Nadu namely South Arcot, North Arcot Coimbatore and Madurai, an average yield of 2556kg/ha was recorded by Ah 8254. This is 30.6% more than TMV. 9 and 23.8% than POL. 2. The highest yield of 3500 kg/ha was recorded in one of the centres indicating its yielding potential under good management and favourable conditions of growing.

The yielding ability of this new strain was also tested by the State Department of Agriculture under adaptive research trial programme in seven districts of Tamil Nadu viz., North Arcot, South Arcot, Coimbatore, Salem, Thanjavur and Trichy during summer season under irrigated condition. (Table. 3). In the eleven trials, an average yield of 1415kg/ha was recorded by Ah 8254 as compared to 1223kg/ha for TMV. 7 and 1188kg/ha for POL. 2 recordly yield increases of 15.7% and 19.1% respectively.

Thus the new selection Ah 8254 has recorded higher yields than the controls TMV. 7, TMV. 9 and POL. 2 both under rainfed and irrigated condition, the increases ranging from 14.9% to 38.6%. Due to its consistant higher yields over years and locations, this selection, Ah 8254 was released as Co. 1 groundnut variety.

Shelling out-turn

The data on shelling percentage recorded by Co. 1 TMV. 9 and POL. 2 in 13 trials conducted from 1974 to 1977 both in rainfed and irrigated seasons are furnished in the Table. 4. The mean

shelling percentage observed in Co. 1 was 74.0 as compared to 70.8% in TMV. 9 and 71.8% in POL. 2. The superiority of Co. 1 in shelling out turn over TMV. 9 and POL. 2 was thus clearly brought out over seasons and locations.

Oil content :

In oil content, the new variety Co. 1 recorded 50.4% as compared to 48.8% in TMV. 9 and 48.7% in POL. 2 (Table. 5). Hence in oil content also, Co. 1 variety was found to excel the checks.

Oil production :

The oil production per unit area is the product of pod yield per unit area, shelling percentage and oil content. The higher pod yield, shelling percentage and oil content of Co. 1 reflected in higher oil production per unit area

also. Co. 1 recorded an oil yield of 538 kg/ha as compared to 427kg/ha for TMV.9 indicating an increased oil yield by 26.1% (Table. 6). When compared to oil yield of POL. 2 (482 kg/ha) Co. 1 recorded higher yield by 11.8%.

Pod and Kernel weights

The pod and kernel weights of Co.1 were comparatively lower than TMV. 9 and POL. 2 as shown in the Tables 7 and 8. Co. 1 is considered to be small seeded variety as compared to TMV, 9 and POL 2 the small seeded nature of this variety helps to minimise the input cost by way of reduced seed rate.

Dormancy

This new variety co. 1 possess is a field dormancy upto 15 days. This phenomenon helps to reduce the heavy yield losses if the harvest is caught in rainy weather. The morphological characters of Co. 1 are as follows:

MORPHOLOGICAL AND GENETIC CHARACTERS OF Co. 1. GROUNDNUT

Distinguishing morphological characters

- | | |
|---|--|
| a. Habit | : Bunch |
| b. Plant height | : Medium 30-35cm |
| c. Mainstem | : Erect, rounded at the base and angular above, Medium thickness, lower portion light purple colour. |
| d. Branches | : 4-5 primaries |
| e. Leaflets | : Oblong, elliptic. Medium size light green foliage. |
| f. Pods | : Small, clustered at the base 1-2 seeded. |
| g. Kernels | : Small, rose testa, dormant upto 15 days after maturity. |
| 2. Maturity | : 100-105 days |
| 3. Weight of 1000 Kernels (g) | : 280 |
| 4. Natural test weight of kernel(g): | 660 |
| (Weight of one litre of Kernel in gram) | |
| 5. Shelling percentage | : 74.0 |

- | | |
|---------------------|---|
| 6. Oil content (%) | : 50.4 |
| 7. Special features | : Field dormancy of about 15 days. This variety is more adaptable to irrigated condition yielding upto 3,500kg/ha |

Adaptability and Stability

The new variety is found to be adaptable to entire Tamilnadu for both irrigated and rainfed conditions as the average increase in yield over the adapted variety TMV. 9 is 14.9 percent. Under irrigated condition, the yield increase is very much pronounced. The shelling percentage and oil content are also stable over years and seasons.

Conclusion

The new Co. 1 groundnut variety is widely adoptable and may be grown throughout Tamil Nadu both during rainfed and irrigated summer seasons. This variety has recorded an average yield of 1031 Kg/ha as compared to 897 kg/ha for TMV. 9 under rainfed condition. Under irrigated condition, it has recorded 1748 Kg/ha as against

1394 Kg for TMV. 9. The yield increases are 15% under rainfed condition and 25% under irrigated condition. In the cultivators' holdings, the new variety has recorded upto 39% increased yield over TMV. 9 under irrigated condition.

In shelling cut-turn, the new variety is superior with 74% as compared to 71% of TMV. 9. In oil content also, Co. 1 (50.4%) has excelled TMV. 9 (48.8%). In short the new variety Co. 1 has recorded 26% more oil per hectare when compared to TMV. 9.

Acknowledgement

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Table 1. Yield performance of Ah 8254 (Co. 1) at Research Stations.

Season	Period of trials	No. of trials	Pod yield in kg/ha.						% increase over	
			Range			Mean			POL 2	TMV. 9
			Ah 8254 (Co)	POL. 2	TMV. 9	Ah 8254 (Co 1)	POL. 2	TMV. 9		
Rainfed	1972-77	12	480-1987	443-2084	386-1542	1031	880	897	17.2	14.9
Irrigated	1975-77	15	1046-3281	1371-2855	907-2312	1748	1399	1394	24.2	25.4
			over all mean			1441	1379	1238	4.5	16.6

Table 2. Yield performance of Ah 8254 (Co. 1) in Adaptive Research trials during Summer 197 AICORPO

District	No. of trials	Pod Yield (Kg/ha)						% increase		
		Range			Mean			POL 2	TMV.9	
		Ah 8254 (Co. 1)	POL-2	Tmv. 9	Ah 8254 (Co. 1)	POL-2	TMV.9			
South Arcot	10	1875-2850	1493-2520	1200-2500	2508	2066	1678			
North Arcot	7	2100-2575	1750-2275	1480-2435	2675	2038	1840			
Coimbatore	8	1470-3060	1120-2500	940-2500	2561	2082	1869			
Madurai	3	1500-3500	1900-2250	1700-3000	2450	2075	2258			
			Over all mean			2558	2065	1844	23.8	38.6

Table 3. Yield performance of Ah. 8254 (Co, 1) in Adaptive Research Trials during summer 1978 - State Department of Agriculture.

District	No. of trials	Pod yield (kg/ha)						% increase over	
		Range			Mean			POL. 2	TMV. 7
		Ah 8254 (Co. 1)	POL. 2	TMV. 7	Ah. 8254 (Co, 1)	POL. 2	TMV. 9		
Madurai	2	1453-1500	1300-1450	850-1450	1477	1375	1150		
Tiruchirepalli	2	1414-1652	1206-1350	819-1505	1523	1278	1312		
Tharjavur	2	1009-1781	829-1392	888-1469	1395	1111	1179		
Salem	2	1452-1657	1022-1827	1402-1502	1555	1425	1452		
Chingleput	1	-	-	-	815	725	845		
South Arcot	1	-	-	-	2200	1360	2000		
North Arcot	1	-	-	-	1967	1707	2020		
Over all mean					1415	1188	1223	19.1	1.87

Table 4 Shelling percentage

Place	Season	Period	No of trials	Shelling percentage						Increase over	
				Range			Mean			POL. 2	TMV. 9
				Ah 8254 (Co. 1)	POL. 2	TMV. 9	Ah. 8254 (Co. 1)	POL. 2	TMV. 9		
Tindi- vanam	Kharif	1974-77	9	65.0-76.5	60.0-74.7	62.2-74.8	72.3	69.1	68.0		
	Summer	1975-77	2	76.7-80.0	78.9	74.8-77.7	78.4	78.9	76.3		
Aliyer- nagar	Kharif	1977	1	-	-	-	73.3	74.7			
	Summer	1976	1	-	-	-	74.6	73.0	69.9		
Over all mean						74.0	71.8	70.8	2.2	3.2	

Table 5. Oil Content (%)
Season : Kharif; Period : 1974-77; No. of trials :- 5

Variety	Range	Mean	Increase	
			POL 2	Over TMV 9
Ah. 8254 (Co 1)	49.32-52.00	50.4	1.7	1.6
POL 2	47.44-49.41	48.7		
TMV. 9	46.30-50.80	48.8		

Table 6 Oil Production

Variety	Pod Yield (Kg/ha)	Shelling percent	Kernel Yield (Kg/ha)	Oil content (percent)	Oil Yield (Kg/ha)	Percent increase over	
						POL 2	TMV. 9
Co. 1	1441	74.0	1066	50.42	638	11.8	26.1
POL 2	1379	71.8	900	48.70	482		
TMV. 9	1236	70.8	875	48.76	427		

Table 7. Hundred pod weight (g)

Season	Period	No. of Trials	Range			Mean		
			Ah 8254 (Co. 1)	POL 2	TMV. 9	Ah. 8254 (Co. 1)	POL. 2	TMV. 9
Kharif	1975-77	3	46.7-72.8	54.3-79.1	56.8-84.2	59.7	63.6	70.5
Summer	1975-77	2	59.5-72.9	57.5-78.2	79.0	66.2	67.9	79.0
Over all mean						62.3	65.3	72.8

Table 8 Hundred Kernel Weight (g)

Season	Period	No. of Trials	Range			Mean		
			Ah. 8254 (Co. 1)	POL 2	TMV. 9	Ah 8254 (Co. 1)	POL. 2	TMV. 9
Kharif	1975-77	5	20.1-33.4	21.5-35.6	19.8-35.9	25.2	29.6	26.6
Summer	1975-77	4	24.3-33.8	20.7-34.4	28.6-34.3	28.1	27.8	32.3
Over all mean						26.5	27.7	29.5