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A foliar disease resistant groundnut variety - VRI Gn 5.

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Abstract: The groundnut culture VG 9711 is an extract of the cross CG 26 x ICGS 44. It is a bunch type maturing in 105-110 days. It is resistant to rust and late leaf spot diseases. It had recorded an average pod yield of 2133 kg ha⁻¹ under rainfed and 2384 kg ha⁻¹ under irrigated conditions. The shelling outturn is 75.0 per cent. The kernels are medium size with red testa colour. The reproductive efficiency of VG 9711 is higher than VRI 2. It has seed dormancy for 45 days. It was released as variety VRI Gn 5 by the State Variety Release Committee during January, 2001.

Key words: Groundnut, Foliar disease resistance, Reproductive efficiency, Seed dormancy.

Introduction

Groundnut (*Arachis hypogaea* L) is the major oilseed crop in India. Late leaf spot and rust are the two major diseases affecting the crop and the yield loss upto 70 per cent was reported due to the combined attack of these two diseases (Subrahmanyam *et al.* 1980a). Some of the valencia (Sub sp. *fastigiata* var. *fastigiata*) genotypes have considerable degree of resistance. However, the association of poor quality traits viz. thick pericarp and shrivelled nature of the kernels limits the utilization of those lines directly (Subrahmanyam and McDonald, 1982). Further, even after hybridization these traits were inherited by resistant progenies. On the other hand, the stable tetraploid lines developed from the inter specific hybridization between *A. hypogaea* x *A. cardenasii* have high level of resistance and desirable quality traits. Hence, such lines were utilized in hybridization with *A. hypogaea* at the Regional Research Station, Vridhachalam and as a result, the culture VG 9711 was evolved.

Materials and Methods

CG 26, a stable tetraploid line developed from interspecific origin (*A. hypogaea* cv. CO 1 x *A. cardenasii*) was utilized as pistillate parent and a high yielding cultivar, ICGS 44 was used as pollen parent in the hybridization programme. From the segregating progenies, culture VG 9711 was fixed in F₅ generation. This culture was identified as a high yielding type with resistance to late leaf spot and rust diseases. It is a bunch type maturing in 105-110 days. It has been evaluated in station trials since 1995. Based on its superior performance, this culture was promoted to multilocation trials and evaluated in various Research Stations of

the University during 1998 and nominated for evaluation under adaptive research trials during *kharif* 1999 and *rabi/summer* 1999-2000 seasons in farmer's holdings in different districts of the state. Simultaneously, it was evaluated in All India Co-ordinated trials during *kharif* 1999 season. The data from all the above trials were consolidated and reported.

Results and Discussion

Culture VG 9711 was evaluated along with VRI 2 and VRI 4 checks at the Regional Research Station, Vridhachalam (Table 1). VG 9711 recorded a mean pod yield of 2485 kg ha⁻¹ and 2676 kg ha⁻¹ under rainfed and irrigated conditions respectively as compared 2195 kg ha⁻¹ 2241 kg ha⁻¹ by VRI 4, the better check. Similarly, VG. 9711 recorded 1589 kg ha⁻¹ and 2294 kg ha⁻¹ as compared to 1326 and 1986 kg ha⁻¹ by VRI 4 in multilocation trials. In adaptive research trials, 2324 and 2182 kg ha⁻¹ were recorded by VG 9711 as against 1903 and 2082 kg ha⁻¹ by VRI 4 under rainfed and irrigated conditions respectively. The overall performance revealed that VG 9711 recorded 2133 kg ha⁻¹ and 2384 kg ha⁻¹ as compared to 1808 kg ha⁻¹ and 2103 kg ha⁻¹ by VRI 4 under rainfed and irrigated conditions respectively.

The quality characters of VG 9711 are presented in Table 2. The highest shelling outturn of 75.0 per cent was recorded by VG 9711 as compared to 73.5 and 72.1 per cent respectively by VRI 2 and VRI 4. The kernels of VG 9711 are medium in size with a 100 seed mass of 41.5 g when compared to 46.4 g by VRI 2. VG 9711 recorded the highest oil content of 50.5 per cent whereas, it was 48.0 and 47.0 per cent in VRI 2 and VRI 4 respectively. As the plants of VG 9711 of remained green even

Table 1 Performance of VG 9711 in comparison with check varieties.

Name of the trials	Rainfed condition			Irrigated condition				
	No. of trials	VG 9711	VRI 2	VRI 4	No. of trials	VG 9711	VRI 2	VRI 4
Station trials	5	2485	2030	2195	5	2676	2043	2241
Multi location trials	17	1589	1225	1326	10	2294	1735	1986
Adaptive research trials	36	2324	1868	1903	32	2182	2111	2082
Mean		2133	1708	1808		2384	1963	2103
% increase over checks			24.9	18.0			21.4	13.4

Table 2. Quality characters and reproductive efficiency of VG 9711 in comparison with check varieties.

Characters	VG 9711	VRI 2	VRI 4
<i>a) Quality characters</i>			
Shelling outtum (%)	75.0	73.5	72.1
100 pod weight (g)	96.5	107.5	111.7
100 kernel weight (g)	41.5	46.4	40.8
Oil content (%)	50.5	48.0	47.0
Dry haulms yield (kg ha ⁻¹)	4175	3270	3880
<i>b) Reproductive efficiency</i>			
Number of flowers produced	60.6	88.6	-
Number of mature pods	30.3	29.4	-
Number of immature pods	6.3	13.1	-
Number of aerial pegs	5.8	8.5	-
<i>Percentage conversion to the flowers produced</i>			
Number of mature pods	50.0	33.2	-
Number of mature pods + Number of immature pods	60.4	48.0	-
Number of mature pods + Number of immature pods + Number of aerial pegs.	70.0	57.6	-

Table 3. Reaction of VG 9711 in comparison to check varieties for rust and late leaf spot diseases.

Varieties	Rust (1-9 scale)		Late leaf spot (1-9 scale)	
	Natural	Artificial	Natural	Artificial
		<i>Kharif 1999</i>		
VG 9711	2.0	3.0	2.0	3.0
VRI 2	7.0	9.0	8.0	9.0
VRI 4	3.0	5.0	4.0	6.0
		<i>Summer 2000</i>		
VG 9	2.0	3.5	3.0	3.5
VRI 2	6.5	9.0	8.0	9.0
VRI 4	3.0	5.0	4.5	6.5

Note: Grade 1 = No disease and Grade 9 = More than 80 % leaf area infected.

Table 4. Morphological characters of VG 9711

1. Culture Number	: VG 9711
2. Origin / Pedigree	: Hybrid derivative of the cross CG 26 x ICGS 44
3. Botanical type	: Intermediate - erect bunch
4. Branching	: Irregular, without flowers on the main stem and sequential branching
5. Habit	: Bunch
6. Stem	: Medium thick, light green
7. Leaf	: Medium size, dark green, oblong-elliptic
8. Flower	: Standard petal orange colour, purple veins radiating from the basal Crescent
9. Peg thickness	: Medium
10. Pod size	: Medium
11. Number of seeds/pod	: 1-2 seeded
12. Pod beak	: Slight to prominent
13. Pod constriction	: Moderate to deep
14. Pod reticulation	: Moderate to prominent
15. Shell thickness	: Medium thick
16. Kernel size and shape	: Medium bold and oblong
17. Seed coat colour	: Red
18. Duration	: 105-110 days
19. Average pod yield (kg ha ⁻¹)	: Rainfed : 2133, Irrigated : 2384
20. 100 pod weight (g)	: 96.5
21. 100 kernel weight (g)	: 41.5
22. Shelling outturn	: 75.0
23. Oil content (%)	: 50.5
24. Seed dormancy	: 45 days

at harvest, the dry haulms yield realised was the highest (4175 kg ha⁻¹) as against 3880 and 3270 kg ha⁻¹ by VRI 4 and VRI 2 respectively.

The reproductive efficiency of VG 9711 as measured by the proportion of mature pods, immature pods and aerial pegs to the total number of flowers produced are presented in Table 2. The results revealed that 50 per cent of the flowers were converted into mature pods in VG 9711 when compared to 33.2 per cent in VRI 2 check. The percentage of flowers that did not produce seeds was 30.0 in VG 9711 and 42.4 in VRI 2.

VG 9711, VRI 2 and VRI 4 were screened for rust and late leaf spot disease both under natural and artificial conditions. The scoring was done in 1-9 scale as suggested by Subrahmanyam *et al.* (1980b). Even under artificial conditions, the maximum score was 3.5 in VG 9711, whereas, it was 9.0 in VRI 2 for both the diseases (Table 3).

The characters of VG 9711 are presented in Table 4. It is an erect bunch type without flowers on the main stem and sequential branching. The leaves are medium sized, dark green and oblong-elliptic. The number of seeds per pod is 1-2 and medium in size with slight to prominent

beak and moderate to deep constriction. The shelling outturn is 75.0. The kernels are medium size with red testa colour. It has seed dormancy for 45 days.

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