SHORT COMMUNICATION

NRCG CS–148: A New Large Seeded Genotype of Groundnut

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Groundnut (*Arachis hypogaea* L.) is a principal oilseed crop in India accounting for more than 25% of the total area under oilseed production in India. Though India accounts for largest area under groundnut, it does not contribute much to the global production and trade, particularly due to the high level of fluctuation in the productivity due to different abiotic and biotic stresses. Development of genotypes endowed with tolerance to different biotic and abiotic yield limiting factors together with high reproductive potential is an important aspect in groundnut improvement. Apart from use for oil extraction, groundnut is also consumed directly because of its high food value owing to protein (22%), carbohydrate (10%), minerals (3%), niacin (17mg/ 100g) and vitamin B especially thiamin (1mg/ 100g) content (Rajgopal *et al.*, 2000). The groundnut, which is used for direct consumption both in domestic and international market, is generally referred as large seeded groundnut or hand picked selection (HPS) groundnut and confectionery groundnut depending upon the quality attributes like chemical, nutritional or sensory properties (Dwivedi and Nigam, 2005).

Large kernel size, elongated shape, uniformity of kernel mass and shape, high proportion of sound mature kernels and testa colour are some of the physical attributes that exemplify the confectionery groundnut (Chuni Lal and Hariprasanna, 2004). A maximum count of 44 kernels per 25 g of the material (Reddi, 1988) or in other words 100-kernel weight of 57 g or more is essential for a groundnut sample to qualify for grading as HPS groundnut. Confectionery groundnut with premium edible grade has a great demand all over the world. Indian groundnut is very popular in the international market for the table purpose, due to its characteristic natural nutty flavour, taste and crunchy texture and also relatively longer shelf life. Therefore, with the growing consumer taste world over for organic food with natural flavour, Indian groundnut has better export opportunity (Nautiyal, 2002). In spite of the immense export potential, only limited genotypes have been bred with an aim to obtain HPS or confectionery groundnuts in India. Considering all these facts, attempts were made to develop large seeded groundnut genotypes with appropriate attributes. A number of interspecific derivative breeding lines have been developed at the National Research Centre for Groundnut (NRCG), Junagadh.

A set of 301 groundnut genotypes developed at NRCG was evaluated in an augmented design with checks during rainy season of 2003 and 2004 at the experimental farm. Each genotype was planted in 3 rows of 3 m. length with recommended spacing. Observations on pod yield/ plant and 100-kernel weight were recorded at harvest. The genotypes NRCG CS-148 and 219 recorded higher 100-kernel weight than the best check TKG 19A among the 35 promising genotypes during 2003 (Table 1). Similarly, NRCG CS-148 showed highest 100-kernel weight (Table 2) among the 15 genotypes, which recorded 100-kernel weight more than 44g in spite of severe drought condition the crop faced during reproductive stage resulting in poor pod and kernel yields/ plant and shelling percent.

The genotype NRCG CS-148 was also evaluated in a separate replicated large seeded groundnut trial along with three checks during rainy season of 2005 at NRCG (Table 3). Data on days to 50 per cent flowering, number of pods/ plant, pod and kernel yields, 100-kernel weight, sound mature kernel percent, shelling percentage, harvest index and oil content were recorded. There was not much difference in days to 50 per cent flowering among NRCG CS-148, GG 20 and TKG 19A indicating equal crop duration of NRCG CS-148 and elite large seeded cultivars. The genotype NRCG CS-148 performed better than all the checks for pod yield, kernel yield, 100-kernel weight, sound mature kernel per cent and shelling per cent. The oil content was also slightly better than all the checks.

Thirty three selected genotypes based on their performance during 2003 and 2004, were further evaluated during rainy season of 2006 along with four checks at KVK, Mundra, Gujarat, where soil conditions are highly conducive for development of large seed size

Table 1. Promising large seeded advance cultures during rainy season 2003

Genotype	Pod weight/ plant (g)	Kernel weight/ plant (g)	100-kernel weight (g)	Shelling percent (%)	Harvest Index (%)
NRCG CS-7	8.1	5.9	46.4	72.84	24.58
NRCG CS-8	13.8	10.5	46.8	76.09	32.21
NRCG CS-12	12.6	9.4	47.7	74.60	31.23
NRCG CS-13	9.0	6.2	48.8	68.89	29.81
NRCG CS-18	14.6	9.9	58.9	67.81	25.19
NRCG CS-60	9.4	6.6	48.6	70.21	20.75
NRCG CS-67	2.7	1.6	47.6	59.26	10.00
NRCG CS-74	10.5	7.5	50.0	71.43	24.75
NRCG CS-76	6.3	4.7	46.1	74.60	24.10
NRCG CS-85	9.0	6.7	46.6	74.44	24.45
NRCG CS-86	9.1	6.8	49.4	74.73	23.53
NRCG CS-89	9.3	6.6	48.0	70.97	24.09
NRCG CS-97	13.3	9.3	47.7	69.92	22.57
NRCG CS-103	8.9	6.6	54.6	74.16	31.88
NRCG CS-115	8.6	6.2	55.3	72.09	21.02
NRCG CS-116	11.0	8.0	48.0	72.73	22.60
NRCG CS-123	6.6	4.7	51.2	71.21	18.80
NRCG CS-126	7.8	5.2	47.7	66.67	16.10
NRCG CS-130	7.1	5.1	53.0	71.83	20.00
NRCG CS-131	12.3	8.6	46.5	69.92	26.06
NRCG CS-132	13.0	9.7	63.6	74.62	28.12
NRCG CS-133	11.4	7.9	51.5	69.30	22.38
NRCG CS-138	11.7	8.1	52.0	69.23	22.07
NRCG CS-145	7.8	5.1	49.8	65.38	19.54
NRCG CS-148	8.0	5.4	**73.2**	67.50	13.50
NRCG CS-161	10.3	7.3	46.2	70.87	21.86
NRCG CS-164	7.2	5.3	51.1	73.61	25.48
NRCG CS-165	10.5	7.4	49.4	70.48	32.31
NRCG CS-178	9.2	6.9	46.8	75.00	29.87
NRCG CS-198	9.3	6.4	47.8	68.82	20.58
NRCG CS-201	12.1	8.5	46.3	70.25	38.99
NRCG CS-218	12.0	9.1	56.4	75.83	35.00
NRCG CS-219	10.1	7.6	**68.3**	75.25	28.68
NRCG CS-223	10.5	6.9	46.2	65.71	32.55
NRCG CS-241	9.2	6.7	47.4	72.83	25.67
TKG 19A	14.5	10.2	67.0	70.34	28.20
BAU 13	10.8	7.6	66.5	70.37	30.40
SEm	2.5	1.8	7.2	3.6	6.0
$CD_{(0.05)}$	5.2	3.8	14.9	7.4	12.4

Table 2. Promising genotypes with higher 100-kernel weight during rainy season 2004

Genotype	Pod yield/ 10 plants (g)	Kernel yield/ 10 plants (g)	100-kernel weight (g)	Shelling percentage (%)
NRCG CS-148	60	33.5	48.5	50.77
NRCG CS-138	22	8.6	48.1	51.13
NRCG CS-283	62	36.2	47.0	51.48
NRCG CS-18	57	15.0	46.6	57.25
NRCG CS-122	32	20.9	44.2	52.90
NRCG CS-266	75	17.7	43.7	46.06
NRCG CS-126	58	20.9	43.1	53.33
NRCG CS-123	46	15.4	42.4	52.90
NRCG CS-276	35	22.0	42.3	48.98
NRCG CS-184	53	26.5	41.4	48.54
NRCG CS-189	61	45.0	41.0	46.67
NRCG CS-218	46	33.0	40.9	45.76
NRCG CS-118	38	23.2	40.3	52.79
NRCG CS-108	86	9.0	40.1	54.17
NRCG CS-132	74	36.5	40.1	52.90
BAU 13	9.4	5.5	32.3	59.3
TKG 19A	11.0	7.4	40.6	67.3
SEm	21.8	11.6	3.6	5.3
$CD_{(0.05)}$	45.4	24.2	7.4	11.0

Table 3. Performance of NRCG CS-148 during rainy season 2005 in a replicated trial

Genotype	Days to 50% flowering	No. of pods/ plant	Pod yield/ plant (g)	Pod yield (kg/ha)	Kernel yield (kg/ha)	100- kernel weight (g)	Sound mature kernels (%)	Shelling percentage (%)	Harvest Index (%)	Oil Content (%)
NRCG CS-148	28.7	9.7	13.9	2398.3	1760.0	66.6	54.0	73.5	37.1	51.8
GG 20	27.7	18.0	17.6	2163.0	1401.3	38.6	39.3	64.6	42.6	51.7
M 13	29.3	13.3	15.5	2292.0	1527.7	44.5	40.5	66.7	57.1	50.5
TKG 19A	26.0	15.0	14.9	2299.3	1309.7	36.5	32.0	56.8	40.9	49.3
SEm	0.3	1.8	2.3	308.1	207.1	5.3	6.1	2.5	4.4	0.6
$CD_{(0.05)}$	0.9	5.0	6.4	875.5	NS	15.1	NS	7.1	12.4	1.8

Table 4. Performance of large seeded genotypes at Mundra, Gujarat during rainy season 2006

Genotype	Pod weight/ plant (g)	100-kernel weight (g)	Shelling percentage (%)	Sound mature kernels (%)
NRCG CS-148	16.7	60.2	68.0	64.0
NRCG CS-285	29.3	46.9	56.0	79.1
NRCG CS-241	18.2	46.5	63.0	79.9
NRCG CS-219	20.5	46.2	62.5	82.1
NRCG CS-188	17.4	46.5	71.5	70.6
M 13	26.6	43.0	55.5	65.2
TKG19A	29.1	50.2	62.5	67.3
B 95	20.4	41.9	51.0	84.4
BAU 13	17.5	46.5	52.5	80.9
SEm	4.8	8.9	7.4	9.7
$CD_{(0.05)}$	9.9	18.6	15.5	20.1

in groundnut. The experiment was undertaken in a randomized block design with two replications and recommended management practices for groundnut were followed to raise a good crop. The observations on pod weight, 100-kernel weight, shelling percentage and sound mature kernel were recorded at harvest (Table 4). Among the 33 genotypes, NRCG CS-148 recorded the highest 100-kernel weight (60.2g), while among the checks TKG 19A (50.2g) had highest kernel size. Genotype NRCG CS-148 recorded kernel size higher than all the checks and also recorded shelling percentage higher than all the checks though pod yield and sound mature kernel percentage were comparatively lower.

The genotype NRCG CS-148 was also screened for reaction to foliar diseases like early leaf spot (*Cercospora arachidicola*), late leaf spot (*Phaeoisariopsis personata*) and rust (*Puccinia arachidis*) on a 1 to 9 scale over two years at NRCG in the field condition during rainy season. Mean scoring showed moderately resistant reaction for late leaf spot and rust compared to the susceptible check, GG 20 (Table 5).

The pods of the genotype are bold, two seeded with moderate reticulation and a slight beak (Fig. 1). The kernels are elongated to elongated-oval in shape with tapering ends and rose testa colour. The genotype is semi-spreading in growth habit. The seed size and other physical

Table 5. Mean disease reaction of NRCG CS-148 against foliar fungal diseases

Year	Genotype	Early leaf spot	Late leaf spot	Rust
2006	NRCG CS-148	3.8	1.5	1.0
	GG 20*	4.3	3.0	1.0
	NRCG CS-352	**5.3**	2.8	1.0
	NRCG CS-296	4.5	**4.8**	1.2
	NRCG CS-176	4.8	2.8	**2.2**
2007	NRCG CS-148	7.2	3.7	4.8
	GG 20*	8.2	4.7	6.2
	NRCG CS-272	**8.5**	**5.8**	4.3
	NRCG CS-337	7.8	3.8	**7.0**

(*Susceptible check; the highest score recorded for each disease is given in bold face along with the name of the genotype)

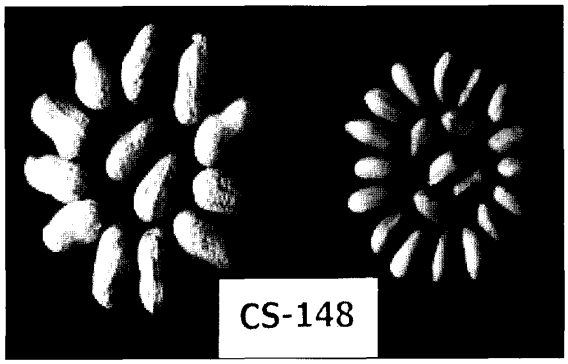

Fig. 1: Pods and kernels of NRCG CS-148

attributes make NRCG CS-148 an ideal donor parent for quality improvement and hence, the genotype can find its place in future breeding programmes aimed at development of large seeded and confectionery type groundnut.

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