A new large-seeded groundnut variety TG 39 for Rajasthan and Karnataka states in India

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Groundnut (*Arachis hypogaea*) has recently attracted attention as a functional food. It has been considered an energy dense food and is now a beneficial food for long-term health as evidenced by several beneficial components found in the seed such as vitamin E, niacin, folate, arginine, copper, magnesium, potassium, calcium, phosphorus, flavonoids, resveratrol, β-sitosterol and phenolic acids (Francisco and Resurreccion 2008). Large seeds in groundnut have greater consumer preference and fetch higher price in domestic and international markets. Value addition to them will further enhance their market price. The groundnut export trade in India is restricted to handpicked selected (HPS) seeds in the absence of suitable varieties with large seeds and good quality (Dwivedi and Nigam 1995, Kale et al. 2000). Most of the large-seeded varieties have longer duration, prolonged fresh seed dormancy, lower shelling outturn and lower proportion of large seeds. Induced mutagenesis along with recombination breeding at Bhabha Atomic Research Centre (BARC), Trombay succeeded in developing several large-seeded genotypes, of which TG 1, TKG 19A, Somnath (TGS 1), TPG 41 and TLG 45 were released for cultivation to the Indian farmers (Badigannavar and Mondal 2007). TG 1 belongs to the Virginia bunch growth habit group (*A. hypogaea* ssp *hypogaea* var *hypogaea*), Somnath to the runner growth habit group with flowers on main stem and the rest of the varieties to the Spanish bunch habit group (*A. hypogaea* ssp *fastigiata* var *vulgaris*).

TG 39, a large-seeded Virginia bunch groundnut variety, was released for cultivation in arid and semi-arid regions of Rajasthan as TBG (Trombay Bikaner Groundnut) 39 during 2008 by the Central Sub-Committee on Crop Standards, Release and Notification of Varieties, Ministry of Agriculture, Government of India. Subsequently, it was also released for cultivation in Northern Transitional Zone 8 and Northern Dry Zone 2 and 3 of Karnataka as TDG (Trombay Dharwad Groundnut) 39 during 2009. It was derived from a cross between TAG 24 and TG 19 using pedigree method at BARC (Kale et al. 2000). TAG 24 is an early maturing variety with high harvest index and wider adaptability (Patil et al. 1995, Kale et al. 1999). TG 19 is a large-seeded Virginia bunch breeding line derived from a cross between TG 17 and TG 1. TG 39 is a collaborative research product of BARC and Rajasthan Agricultural University, Bikaner, Rajasthan and University of Agricultural Sciences, Dharwad, Karnataka.

TG 39 was evaluated in yield trials in a randomized block design with four replications in rainy season (June–October) during 1996 and 1997 at BARC. The net plot size was 15 m^2 and the spacing was 50 cm between rows and 10 cm between plants within a row. In these trials, TG 39 recorded 2990 kg ha^{-1} pod yield and 2093 kg ha^{-1} seed yield with 30% and 35% superiority over the best check variety, TKG 19A (2303 and 1543 kg ha^{-1}), respectively (Kale et al. 2000). It matured in 115–120 days with a shelling outturn of 70% and 100-seed weight of 72 g as compared to 67% and 67 g in the best check variety.

In Rajasthan, TG 39 was evaluated in multilocational trials at Mandor, Hanumangarh, Durgapura and Bikaner during 2001–06 rainy season along with large-seeded check varieties, M 13 and TKG 19A. In these trials, TG 39 produced a mean pod yield of 3154 kg ha^{-1} registering 15.8% and 16.5% increase over TKG 19A and M 13,

respectively (Table 1). It matured in 116 days with 65% shelling outturn and 66 g 100-seed weight. In nine adaptive trials conducted at Bikaner, Hanumangarh, Jaipur and Lunkaransar during rainy season 2006, TG 39 produced a mean pod yield of 2364 kg ha^{-1} with 25% increase over M 13. In multilocational evaluation trials in Karnataka, TG 39 recorded a mean pod yield of 2234 kg ha^{-1} and seed yield of 1522 kg ha^{-1} with superiority of 14.7% and 16.5% over large-seeded check variety, Mutant 28-2 in rainy season during 2003–06, respectively (Table 2). Similarly in summer trials (2003–06) in Karnataka, TG 39 also gave superior pod and seed yields of 3041 kg ha^{-1} and 2173 kg ha^{-1} with 19.8% and 24.4% increase over Mutant 28-2, respectively (Table 3). It matured in 115–120 days with 70% shelling outturn and 73 g 100-seed weight.

TG 39 is characterized by erect growth habit with semi-dwarf height, alternate flowering and dark green leaves (Fig. 1). The plant has 9 primary and 14 secondary

Table 1. Mean performance of TG 39 in multilocational varietal trials in Rajasthan, 2001–06 rainy season.

Year of testing	No. of locations	Pod yield (kg ha^{-1})		
		TG 39	M 13	TKG 19A
2001	2	3160	3660	–
2003	1	4660	3320	–
2004	4	2133	1824	–
2005	4	3323	2682	2612
2006	4	3628	2987	2836
Mean (Weighted)		3154	2707	2724
% increase over check varieties			16.5	15.8

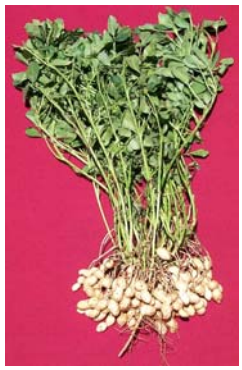

Figure 1. A plant of groundnut variety TG 39.

Table 2. Mean performance of TG 39 in different testing centers in Karnataka, 2003–06 rainy season.

Testing center	No. of years tested	Pod yield (kg ha^{-1})		Seed yield (kg ha^{-1})	
		TG 39	Mutant 28-2	TG 39	Mutant 28-2
Dharwad	3	3054	2558	2061	1723
Nippani	3	2823	2731	1950	1864
Devihosur	3	2382	2141	1667	1466
Sankeshwar	2	1931	1435	1280	982
Raichur	3	1923	1721	1256	1090
Kawadimatti	3	1573	1654	1126	1063
Bagalkot	3	2188	1530	1451	1029
Bijapur	1	1235	1039	864	748
Mean (Weighted)		2234	1948	1522	1306
% increase over Mutant 28-2			14.7		16.5

Table 3. Mean performance of TG 39 in different testing centers in Karnataka, 2003–06 summer season.

Testing center	No. of years tested	Pod yield (kg ha^{-1})		Seed yield (kg ha^{-1})	
		TG 39	Mutant 28-2	TG 39	Mutant 28-2
Dharwad	3	3509	3123	2477	2115
Raichur	3	3365	2827	2458	1978
Kawadimatti	3	3101	2496	2199	1721
Bagalkot	3	2188	1703	1558	1171
Mean (Weighted)		3041	2537	2173	1746
% increase over Mutant 28-2			19.8		24.4

branches. Pods are mostly two-seeded with medium constriction, medium reticulation and medium to prominent beak (Fig. 2). Seeds are rose in color and contain 49.9% oil, 26.5% protein, 12.6% carbohydrate and 4.5% sucrose. The oil contains 59.0% oleic and 23.0% linoleic fatty acids with oleic/linoleic acid ratio of 2.56.

Figure 2. Seeds and pods of TG 39 (left) and normal seed variety TG 37A (right).

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