

PERFORMANCE OF IMPROVED GROUNDNUT VARIETY GPBD-4 IN FARMERS FIELD AT SHIMOGA DISTRICT OF KARNATAKA

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ABSTRACT

Front line demonstrations on Groundnut variety GPBD-4 was conducted for five years during rabi seasons (2005-06 to 2009- 2010) in farmers field in five different villages of three taluks (Soraba, Shikaripura and Shimoga) in Shimoga district of Karnataka state. It was observed that average pod yield performance of 60 demonstrations in an area of 24 ha ranged from 23.55 to 28.94 q/ha. There was 20.90 per cent increase in pod yield in demonstrated Groundnut variety over local check during all the five years of demonstration. In terms of economics also demonstrated Groundnut variety GPBD-4 was found economically superior with higher B:C ratio of 1:3.00 as against the lower B:C ratio of 1:2.41 in local check variety TMV-2.

Key words: FLD Groundnut, GPBD-4, Groundnut.

INTRODUCTION

Groundnut is considered as one of the universally preferred oilseed crops and is grown throughout the world. It has gained lot of economic and nutritional importance world wide. It has now been regarded as poor man's cashew and has become a replacement for expensive nuts such as almonds, cashews and pistachio in urban snack.

About two third of the world production of groundnut seed serves for the production of oil, which is used for the cooking, salad oil and margarine and lower grades of oil are used in soap manufacture. Oilseeds occupy a pride place in the Indian economy and groundnut is a kingpin among oilseeds grown in India. Groundnut seeds contain high quality edible oil about 45%, easily digestible protein (24%) and carbohydrates (18%). More than 80 per cent of groundnut production in the country is used for extraction of oil and about two per cent is exported for confectionary purposes. Commercially, groundnut is the world's fourth most important source of edible oil and third most important source of vegetable protein. Currently, groundnut is grown on nearly 25.20 m ha around the world with an annual production of 36.90 m

tons of nuts-in-shell. The major producers are China, India, Indonesia, and the USA which together account for two-thirds of the world output. Developing countries, account for 82 per cent of total groundnut area and 79 per cent of production of the world. Among the developing countries, production is mainly concentrated in Asia and Africa with Asia accounting for 51 per cent of global area and 60 per cent of production. India occupies 30 per cent of global area (6.6 m ha) and contributes 22 per cent (5.9 million tons) of total groundnut production. (FAO, 2007)

World groundnut production stood at 34.43 m tones in 2009-10 and India with 6.25 m tones (18%) is the second largest producer after china with 14.30 m tones (32.95%).

Gujarat is the leading producer contributing 29.63 percent of total production followed by Tamil Nadu (20.78%) Andra Pradesh (15.23%), Rajasthan (8.23%), Maharashtra (8.23%) and Karnataka (7.82%).

In Karnataka normal area under groundnut is 0.86 million hectares with a production of 0.6m tones. About 70 percent of the crop is grown in black soil and the remaining in red soils.

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Shimoga is one of the district where groundnut is being grown in both Kharif and rabi seasons. As the district groundnut area falls under STZ with assured rainfall and cloudy weather situations very commonly prevailed during the cropping season of Groundnut, Under such climatic conditions, occurrence of leaf spot disease in groundnut crop is quite obvious, which results in substantial yield loss with respect to pods and haulm yield. The present study was undertaken to ascertain the role of demonstration in exhibiting the leaf spot resistance of improved groundnut variety GPBD-4 and thus increasing yield.

GPBD- 4 is an improved Spanish bunch groundnut variety developed at University of Agricultural Sciences, Dharwad, it is popular in Karnataka and Southern states of India (Gowda *et al.*, 2002). It has a desirable combination of early maturity, high yield, high pod growth rate, desirable pod and kernel features, high oil and protein content, optimum oleic/linoleic acid (O/L) ratio and resistant to late leaf spot and rust.

Groundnut productivity level (926 kg per ha) of our country is far below the world productivity level (1370 kg per ha). Several reasons are attributed for low yield levels viz, lack of improved high yielding cultivars, cultivation under shallow soils of low fertility, uneven rainfall distribution, continuous cropping without rotation of crop, low plant population and incidence of foliar diseases and pest, non-availability of improved varieties that are cited as the major limiting factors in most of the groundnut growing regions. This is an indication of the incomplete utilization of the genetic potential of the crop in our country without proper crop management practices. Availability of wide genetic variability with broad genetic base is pre requisite

for the development of improved varieties with wide adoption. There are three major sources of genetic variability viz, already available hereditary differences among wild relatives or the cultivated species, a genetic variability recombined through hybridization. And the genetic differences created artificially by use of mutagens (Gregory, 1961).

MATERIAL AND METHODS

Krishi Vigyana Kendra conducted front line demonstration on Groundnut variety GPBD-4 released by UAS, Dharwad during the years 2005-06 to 2009-10 during rabi seasons with total area of 4.8 ha by involving 12 farmers in each year (0.4 ha for each farmer). Totally 60 demonstrations on groundnut crop in an area of 24 hectares by involving 60 farmers in all the five years of demonstrations were conducted in 3 taluka of Shimoga district (Sagar, Shikaripur and Shimoga taluks). Demonstrations were conducted under irrigated condition and the soil of demonstration plots ranged from medium to high in nutrient Status TMV-2 was grown as standard check variety. The yield data was recorded from demonstration and local plots.

RESULTS AND DISCUSSION

The data of front line demonstration presented in Table – 1 showed that performance of 60 demonstrated Groundnut crop in an area of four ha ranged from 23.55 to 28.94 q/ha. The average yield of Groundnut pods was found to be 25.94 q/ha whereas for local crop, it was found to be 21.43 q/ha. There was 20.90 percent average increase in demonstration variety (GPBD-4) pod yield over standard check variety (TMV-2). The increased yield in demonstrated variety may be attributed to better growth and yield parameters observed in the demonstrated variety besides its resistance to leaf spot disease. Similar results are also reported by www.zpdviii.gov.in.oilseeds2007

TABLE 1: Yield performance of groundnut varieties demonstration under FLD programme in Shimoga District of Karnataka.

Year	Name of the block / village	Variety	No. of demonstration	Area (ha)	Pod Yield			
					Demonstration		check	% increase in yield
					Max	Avg	Avg	
2009-10	Begur, Shikaripura tq.	GPBD - 4	12	4.80	29.12	26.08	22.27	17.10
2008-09	Mallapura, Soraba Tq.	GPBD - 4	12	4.80	27.50	23.55	19.37	21.57
2007-08	Tumari Koppa, Soraba tq	GPBD - 4	12	4.80	30.00	24.75	19.87	24.55
2006-07	Devikoppa, Soraba Tq.	GPBD - 4	12	4.80	37.50	26.25	22.25	17.97
2005-06	Bedarahosally, Shimoga tq	GPBD - 4	12	4.80	31.80	28.94	23.38	23.78

Results of the demonstrations had shown that the use of leaf spot resistant groundnut variety resulted in higher net income in economic terms also. The farmers have earned average net income of Rs. 38025/ha through the use of improved variety. Comparative results of the demonstration was further highlighted by higher benefit cost ratio of 1:3.00 as against local variety which recorded lower BC ratio of 1:2.41. In this connection, there is a wide scope to increase the area under this variety in groundnut growing areas of the district.

Similar results were obtained during 2005 under irrigated situation, 10 hectare demonstrations were implemented involving 20 farmers with varieties GPBD-4 and TGLPS-3. The average yield of these demonstrations was 19.2 q/ha against local check and the increased productivity was 24.7 per cent. The highest average yield of 28.6 q/ha was obtained at Bagalkot with variety GPBD-4. Maximum yield (29 q/ha) was achieved at Bagalkot with variety GPBD-4. The cost of production of irrigated demonstration was ranging from Rs.7865 to Rs.10000/ha and Rs.5385 to Rs.8960 for local check. (zpdviii.gov.in/oilseeds 2005).

Further during 2007, under irrigated situation 15 hectare demonstrations were implemented involving 30 farmers with variety GPBD-4. The average demonstration yield of these

demonstration was 17.7q/ha against 15.7 q/ha local check, exhibiting increased yield of 12.7%. The highest average yield was 22.8 q/ha (Belgaum with variety GPBD-4). Maximum yield of 25.5 q/ha obtained at Belgaum and minimum of 5.5 q/ha at Bagalkot. The cost of production ranged from Rs.9667 to Rs.9694/ha. The cost of production of local check also ranged from Rs.8828 to 9211/ha. Low yield was reported at Bagalkot was due to poor pod filling. (zpdviii.gov.in/oilseeds 2007).

In all the years of demonstration GPBD-4 variety performed well in terms of resistance to leaf spot compared to TMV-2 and also for collar rot and leaf eating caterpillar compared to the check variety TMV-2 (Table-III).

Varieties GPBD 4 and Mutant 28-2 were reported to be resistant to late leaf spot; Dh 8, K134, and ICGV 86590 tolerant and all other varieties like TMV2, JL 24, KRG1, R 8808, R9251, Dh40, Dh3-30, Dh43, TAG 24, S206 and S230 were reported to be susceptible (Gowda *et al.* 2002a, Gowda *et al.* 2002b)

By the end of rabi 2010 it is fascinating to note that this variety has spread to 25 villages extending over an area of 750 acres in the district. Further, this variety had also spread to neighbouring coastal district of Udupi highlighting its sustainable performance even in adverse climatic situations.

TABLE 2: Cost economics of Groundnut varieties demonstrated under FLD programme in Shimoga district.

Years	Demonstration			Control / check			B:C ratio	
	Total (Rs/ha)	Gross return (Rs/ha)	Net income (Rs/ha)	Total (Rs/ha)	Gross return (Rs/ha)	Net income (Rs/ha)	Demonstration	Check
2009-10	19560	69200	45700	17775	55675	37900	1:3.34	1:3.13
2008-09	18500	58875	40375	21500	48425	26925	1:3.18	1:2.25
2007-08	18150	53213	35062	19750	42720	22970	1:2.93	1:2.16
2006-07	19500	52500	33000	19750	44500	24750	1:2.69	1:2.25
2005-06	19000	54986	35986	19500	44422	24922	1:2.89	2.27
			38025			27493	3.00	2.41

TABLE 3: Disease and pest status of groundnut varieties demonstrated under FLD programme in Shimoga district

Years	% leaf spot incidence		% collar rot		% infest station of leaf eating caterpillar	
	GPBD-4	TMV-2	GPBD-4	TMV-2	GPBD-4	TMV-2
2009-10	3.5	13.5	6.5	11.0	1.5	4.5
2008-09	2.5	16.5	4.5	6.5	3.5	5.0
2007-08	2.0	18.0	7.0	8.5	2.0	6.5
2006-07	3.6	15.0	6.5	7.0	2.5	7.0
2005-06	1.5	14.5	5.0	8.0	3.0	4.5

REFERENCES

- FAO, (2007,) Food and Agricultural Organization of the United Nations, FAOSTAT database, <http://www.FAO.ORG>.
- Gregory, W.C., (1961), The efficiency of mutation breeding. Mutation and Plant Breeding. *National Academy for Sciences, National Res. Council Publications*, **891**: 461-486.
- Gowda, M. V. C., Motagi, B. N., Naidu, G. K., Diddimani, S. N. and Sheshagiri, R., (2002a,) GPBD-4: a Spanish bunch groundnut genotype resistant to rust and late leaf spot. *International Arachis Newsletters*, **22** : 29-32.
- Gowda, M. V. C., Motagi, B. N., Sheshagiri, R., Naidu, G. K. and Rajendraprasad, M. N., (2002b,) Mutant 28-2 : A bold seeded disease and pest resistant groundnut genotypes for Karnataka, India. *International Arachis Newsletter*, **22** : 16-17.
- Motagi, B. N., Gowda, M. V. C and Naidu, G. K., (2000a,) Resistant genotype to stabilize productivity in foliar epidemics in Spanish type groundnuts, pp. 222-223 in *National seminar on Oilseeds and Oils-Research and Development Needs in the Millennium*, 2-4 February 2000, Directorate of Oilseed research Rajendranagar, Hyderabad, India: Indian society of Oilseeds Research, Directorate of oilseeds Research.
- Motagi, B. N., Gowda, M. V. C. and Nigam, S. N., (2000b,) Oil recovery and quality influenced by foliar diseases in groundnut. *International Arachis Newsletters*, **20** : 582-584.\
- Nadaf, H. L., (1993,) Investigation on the nature of origin, diversity and potentiality of induced mutants in groundnut. *Ph. D. Thesis University of Agricultural sciences, Dharwad,*