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Development of Multiblooming Greengram genotypes with Moderate Mosaic Yellow in resistance

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Abstract

The green gram culture VGG04-001 is developed from a cross derivative of K 1 x Vellore local released as VBN (Gg)3 maturing in 65-70 days and suited for cultivation under both under rainfed and irrigated conditions. It has a yield potential of 826 Kg per hectare. It is multiblooming type with moderately resistance to Yellow Mosaic Virus and Powdery Mildew. It possesses desirable characters like high protein content (24.16%). It is recommended for cultivation in Tamil Nadu except Nilgiris and Kanyakumari districts of Tamil Nadu.

Keywords: VGG04-001; Green gram; Yellow Mosaic Virus; Powdery Mildew; Rainfed; Irrigated

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Introduction

Green gram (*Vigna radiata* (L.) Wilczek) is a popular pulse crop of Southeast Asia and popularly known as Mungbean in India. Pulses are prone to high incidence of diseases and insect pests [1]. The most serious disease of Green gram is MYMV and Powdery Mildew Disease. The varietal development in Green gram is necessary to fulfill the demand of people and resistant varieties. Green gram germplasm and breeding lines with resistance to MYMV have been reported from Bangladesh,

India, Pakistan and Sri Lanka [2-3]. With these objectives this variety green gram VBN (Gg) 3 was developed and released as resistant variety to MYMV and PMD with high yield potential.

Materials and Methods

Crossing programmed was started during Rabi 2010-11 between K 1 x Vellore local. The F1 to F7 generation was studied at Tamil Nadu Agricultural University, Coimbatore and Primary and Advanced Yield Trials (PYT & AYT) were conducted in Randomized Block Design with three replications along with local

check variety at TNAU, Research Centre. The culture VGG04-001 was further tested under multilocation trial (MLT) at different research stations of the Tamil Nadu Agricultural University during *Kharif* for two years. It was promoted to Adaptive Research Trial (ART) during *Kharif* for three years and was tested under farmers holdings in collaboration with State Department of Agriculture. Laboratory studies were conducted to evaluate the quality traits viz. protein (Kelplus) available at Home Science College, AC&RI, Madurai.

Results and Discussion

The green gram culture VGG04-001 is a cross derivative of K1 x Vellore local maturing in 65-75 days. This culture is resistant to Yellow Mosaic Virus and Powdery mildew. (Table 4-6). It has high protein content of 24.16 per cent

than check varieties. It is multi blooming type. This culture is suitable for growing in all the parts of Tamil Nadu except Nilgiris and Kanyakumari districts. The overall average yield for VGG04-001 is 826 kg/ha which is 15.98, 19.00 and 8.23 percent increased yield over VBN(Gg)2 (694 kg/ha), CO 6 (669 kg/ha) and CO (Gg) 7 (712 kg/ha) respectively (Table 1). Under irrigated condition the above culture has also performed well by recording 878 kg/ha. The yield increases were 17.31, 19.13 and 7.28 per cent over the above check varieties VBN (Gg) 2 (726 kg/ha), CO 6 (710kg/ha) and CO (Gg) 7 (814 kg/ha) respectively (Table 2). Under rainfed condition the culture VGG04-001 has recorded 775 kg/ha with 14.45, 18.96 and 9.41 per cent yield increase over the check varieties VBN (Gg) 2 (663 kg/ha), CO 6 (628 kg/ha) and CO (Gg) 7 (702 kg/ha) respectively (Table 3).

Table 1: Abstract for the performance of green gram VBN (Gg) 3 (culture VGG O4-001) in various trials.

Trials	No. of trials	Entries					% increase over			
							VBN (Gg)2	CO 6	CO (Gg)7	TARM-1
Station	11	987	797	761	814		19.25	22.89	17.52	-
MLT	10	769	654	659	-	-	14.95	14.3	-	-
AICPIP (Rabi 2005-06)	4	503 **	-	-	-	399	-	-	-	20.67
ART	116	710	624	619	-	-	12.11	12.81	-	-
OFT	12	839	702	637	702		16.32	24.07	16.32	-
Mean	*153	826	694	669	758		-	-	-	
Over all per cent increase							15.98	19	8.23	
* Total number of trials ** Not included for calculating mean										

Table 2: Abstract for the performance of green gram VBN (Gg) 3 (culture VGG O4-001) in various trials under irrigated condition.

Trials	No. of trials	Entries				% increase over		
		VGG 04-001	VBN (Gg)2	CO 6	CO(Gg)7	VBN (Gg)2	CO 6	CO (Gg)7
Station	11	987	797	761	814	-	-	-
MLT	10	769	654	659	-	-	-	-
Mean		878	726	710	814	-	-	-
Overall per cent increase						17.31	19.13	7.28

Table 3: Abstract for the performance of green gram VBN (Gg) 3 (culture VGG O4-001) in various trials under rainfed condition.

Trials	No. of locations	Seed yield (kg/ha)			
		VGG 04-001	VBN (Gg) 2	CO 6	CO (Gg) 7
ART	122	710	624	619	-
OFT	12	839	702	637	702
Mean		775	663	628	702
% increase over			14.45	18.96	9.41

Table 4: Reaction of green gram VBN (Gg) 3 (culture VGG 04-001) against Powdery Mildew Disease at Vamban.

Sl. No	Season & Year	Powdery Mildew score (0-9 scale)			
		VGG-04-001	VBN (Gg) 2	CO (Gg) 7	CO 6
1.	Rabi 2012-13 seasons	1*	3	-	3
2.	Rabi 2013-14 seasons	1*	3	5	3

* Resistant

Powdery Mildew Disease (Scale):

0-Immune 1-Resistant 3-Moderately resistant 5-Moderately susceptible 7-Susceptible 9-Highly susceptible

Table 5: Reaction of greengram VBN (Gg) 3 (culture VGG04-001) against Yellow Mosaic Virus Disease.

Sl. No	Season & Year	Yellow Mosaic Virus score (0-9 scale)			
		VGG04-001	VBN (Gg) 2	CO 6	CO (Gg) 7
1.	Kharif 2012	1*	5	7	7
2.	Kharif 2013	1*	5	7	9

* Resistant

Yellow Mosaic Virus (Scale) :

0 – Immune 1 - Resistant 3 - Moderately resistant 5 - Moderately susceptible 7 – Susceptible 9 - Highly susceptible

Table 6: Reaction of greengram VBN (Gg) 3 (culture VGG 04-001) to pod borer incidence at NPRC, Vamban.

Sl. No.	Season	Pod borer damage (per cent)			
		VGG 04-001	VBN (Gg) 2	CO6	CO (Gg)7
1.	Kharif 2005	6.0	6.7	9.5	11.3
2.	Rabi 2005-06	6.0	6.8	8.3	7.3

In station trials the culture VGG04-001 has recorded 987 kg/ha which is 19.25, 22.89 and 17.52 per cent increased yield over the checks VBN (Gg) 2 (797 kg/ha), CO 6 (761kg/ha) and CO (Gg) 7 (814 kg/ha) respectively. In Multilocal trial the culture VGG04-001 has recorded 769 kg/ha which is 14.95 and 14.30 per cent increased yield over the checks VBN(Gg)2 (654 kg/ha) and CO 6 (659kg/ha) respectively. In Adaptive Research Trials (116 trials) the culture VGG 04-001 has recorded an average yield of 710 kg/ha which is 12.11 (624kg/ha) and 12.81 (619 kg/ha) per cent increased yield over the checks VBN (Gg) 2 and CO 6 respectively. In the On Farm Trials (12 Nos.) conducted at Pudukkottai and Trichy districts, the culture VGG 04-001 has recorded 839 kg/ha which is 16.32, 24.07 and 16.32 per cent increased yield over checks VBN(Gg)2 (702 kg/ha), CO6 (637 kg/ha) and CO (Gg)7 (702 kg/ha) respectively. The green gram culture VGG04-001 contains high protein content of 24.16 % as against VBN (Gg) 2 (20.10%), CO6 (22.33 %) and CO (Gg) 7(21.41 %). Cooking time and water adsorption is lesser than the check varieties (Table 7).

Based on the high yield with resistance to Mungbean Yellow Mosaic Virus and Powdery Mildew disease. This culture VGG04-001 is identified as a new variety (Green gram VBN (Gg) 3) for cultivation in Tamil Nadu by State Varietal Release Committee.

Table 7. Protein content of Greengram VBN (Gg) 3 (Culture VG04-001).

Entries	Per cent
VGG 04-001	24.16
VBN(Gg)2	20.10
CO 6	22.33
CO(Gg)7	21.41

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