

## Vamban 3 Blackgram : A yellow mosaic resistant variety

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**Abstract :** The black gram genotype VBG 18 is a cross derivative from LBG 402 X LBG 17. It matures in 65-70 days. This culture recorded high seed yield in station trials, multilocation trials and adaptive research trials. The average seed yield is about 775 and 826 kg/ha respectively in irrigated and rainfed conditions. The highest yield potential is 1800 kg/ha. It showed resistance to yellow mosaic virus disease and moderate resistance to powdery mildew and pod borer damage. Hence, the culture VBG 18 is released as Vamban 3 black gram for commercial cultivation in Tamil Nadu during 2000. (*Key words: Vamban 3 black gram, High yield, Resistance, Yellow mosaic disease*)

Black gram (*Vigna mungo* L. Hepper) is an important pulse crop in Tamil Nadu. It occupies 4.23 lakh hectares with the production of 1.97 lakh MT. The average productivity of black gram is 465 kg/ha (Anonymous, 1996). Among the districts of Tamil Nadu, Thiruvarur had the highest area of black gram (0.51 lakh ha) but with the productivity of 137 kg/ha. To improve the productivity of black gram, intensive breeding programme was initiated at National Pulses Research Centre (NPRC), Vamban. This resulted in the evolution of the culture VBG 18 and it was released during January, 2000 as Vamban 3 black gram for cultivation in Tamil Nadu.

### Materials and Methods

The VBG 18 black gram culture was evolved at National Pulses Research Center, Vamban. It is a cross derivation of LBG 402 X LBG 17. The culture VBG 18 and checks were evaluated in station trials at National Pulses Research Centre, Vamban from 1993 to 1999. The culture was tested in multilocation trials during 1995 and in adaptive research trials during 1996-97 and 1997-98 in farmers holdings of different districts.

### Results and Discussion

The culture VBG 18 was tested in station trials, multilocation trials and adaptive research trials. The results are presented in Table 1 to 3.

**Station trials:** The culture VBG 18 was tested at NPRC, Vamban from 1993 to 1999. It recorded an average seed yield of 530 kg/ha, which was 20.2, 18.0 and 45.6 per cent increase over Vamban 1, Vamban 2 and CO 5 respectively (Table-1). Considering the seasonwise performance, this culture recorded an average seed yield of 510 and 564 kg/ha during *kharif*

and *rabi* seasons respectively which was about 22.0, 12.6 and 67.8 (*kharif*), 17.0, 27.6 and 20.3 (*rabi*) per cent higher over vamban 1, Vamban 2 and CO 5 respectively.

**Multilocation trials:** The culture VBG 18 was tested in multilocation trials during *kharif* 1995 and *rabi* 1995. It recorded an average yield of 709 kg/ha, while the check varieties Vamban 1 and CO5 recorded 573 and 557 kg/ha respectively (Table-2) which was about 23.7 and 27.3 per cent higher than that of Vamban 1 and CO 5 respectively. Considering the seasonwise performance, VBG 18 recorded 728 and 687 kg/ha during *kharif* and *rabi* seasons respectively which was 28.2 and 30.5 (*kharif*), 18.7 and 27.3 (*rabi*) per cent higher over Vamban 1 and CO 5 respectively.

**Adaptive research trials:** The culture VBG 18 was tested in adaptive research trials during 1996-97 and 1997-98 at farmers' holdings. The culture VBG 18 recorded an average seed yield of 774 kg/ha, which was 14.5, 11.7 and 12.3 per cent higher over Vamban 1, Vamban 2 and CO 5 respectively (Table-3). Considering the seasonwise performance, VBG 18 recorded 722, 775 and 826 kg/ha during *kharif*, *rabi* and summer seasons respectively. The highest yield potential in adaptive research trial was 1800 kg/ha at Tirunelveli district.

**Morphological characteristics of VBG 18:** The VBG 18 black gram matures in 65-70 days with 30-35 days for 50% flowering. It is an erect plant type with the plant height of 25 to 35 cm. The leaf shape is ovate-lanceolate; the flower colour is yellow; pods are hairy and seed are dull black in colour. The 100-seed weight is about 4.00-4.40 g. The average seed yield of VBG 18 is about 775 kg/ha in rainfed and 826 kg/ha in irrigated conditions respectively.

*Reaction to pests and diseases:* The culture VBG 18 was resistant to yellow mosaic virus disease (grade 1) while the check CO 5 was recorded most susceptible (grade 9) when grown in areas namely Vamban and Panpozhi village (Tenkasi). With regard to powdery mildew resistance, VBG 18 showed moderate resistance (grade 3) while the check varieties Vamban 1 (grade 7), Vamban 2 (grade 5) and CO 5 (grade 7) recorded susceptible or most susceptible reaction. Considering reaction to pod borer damage, the culture VBG 18 showed moderate susceptibility (3.4%) while the check varieties Vamban 1, Vamban 2 and CO 5 recorded 11.1, 5.0 and 6.1 per cent pod borer damage respectively.

*Physical, chemical and cooking characteristics:* The seeds of VBG 18 had almost similar physical and chemical characteristics namely

length, width, breadth, bulk density, 100-seed weight, total sugar and reducing sugar when compared to check varieties, Vamban 1, Vamban 2 and CO 5. It recorded 22.4 per cent protein, which was equal to that of Vamban 2 while Vamban 1 and CO 5 recorded 21.7 per cent protein content. The suitability for *idli* preparation was analysed using VBG 18 and the existing check varieties. The results indicated that the colour and texture of the prepared *idlies* were found similar to CO 5 but better than Vamban 1 and Vamban 2.

Considering the foregoing discussion, the culture VBG 18 recorded high seed yield in all trials and seasons. Besides high seed yield, the culture also showed resistance to yellow mosaic virus disease and moderate reaction to powdery mildew and pod borer damage. Hence, the state variety release committee released the culture VBG 18 as Vamban 3 black gram during January 2000 for commercial cultivation in Tamil Nadu.

**Table 1.** Performance of black gram culture VBG 18 at NPRC, Vamban

Season/Year (ch.)	Seed yield kg ha <sup>-1</sup> )			
	VBG 18 (ch.)	Vamban 1	Vamban 2	Co 5(ch.)
<i>Kharif</i> 1993	577	500	514	477
1994	318	260	260	235
1995	429	427	219	146
1996	280	203	323	136
1997	546	345	681	482
1998	680	540	550	300
1999	729	650	625	350
Mean	510	418	453	304
Percentage of increase	-	22.0	12.6	67.8
<i>Rabi</i>				
1995	576	446	500	372
1996	439	257	291	397
1997	523	627	428	484
1998	719	598	550	623
Mean	564	482	442	469
Percentage of increase	-	17.0	27.6	20.3
Overall mean	530	441	449	364
Percentage of increase	-	20.2	18.0	45.6

**Table 2.** Performance of black gram culture VBG 18 in multilocation trials

Season/Location	VBG 18	Seed yield (kg ha <sup>-1</sup> )	
		Vamban 1 (ch.)	CO 5(ch.)
<i>Kharif 1995</i>			
Coimbatore	487	461	484
Vellore	489	165	450
Virudhachalam	612	439	248
Killikulam	850	598	680
Tindivanam	365	375	414
Paiyur	1823	1509	1432
Vamban	472	432	199
Mean	728	568	558
Percentage of increase	-	28.2	30.5
<i>Rabi 1995</i>			
Coimbatore	139	254	345
Pattukkottai	1424	955	903
Kumalur	632	600	640
Tindivanam	535	485	467
Paiyur	813	732	607
Vamban	576	446	372
Mean	687	579	556
% of increase	-	18.7	23.6
Overall mean	709	573	557
Overall percentage of increase	-	23.7	27.3

**Table 3a.** Performance of black gram culture VBG 18 in adaptive research trials during kharif seasons of 1996-97 and 1997-98

District	No. of trials	Seed yield (kg ha <sup>-1</sup> )			
		VBG 18	Vamban 1 (ch.)	Vamban 2 (ch.)	CO 5 (ch.)
<i>Kharif</i>					
Coimbatore	2	576	383	422	654
Cuddalore	4	754	611	597	594
Dharmapuri	1	856	802	835	779
Dindigul	7	807	730	772	633
Erode	2	1044	875	975	875
Kancheepuram	3	807	734	-	718
Madurai	2	343	260	110	361
Namakkal	3	975	854	797	865
Pudukkottai	2	613	545	630	400
Salem	4	796	738	743	732
Sivagangai	2	819	713	800	794
Thanjavur	3	470	433	428	409
Theni	2	296	279	285	210
Thiruvannamalai	2	902	840	889	815
Tirunelveli	1	1035	1040	1020	-
Trichy	4	519	424	450	400
Vellore	2	742	735	588	802
Mean	-	722	624	660	621
Percentage of increase	-	-	15.7	9.4	16.3

Table 3b. Performance of black gram culture VBG 18 in adaptive research trials during rabi seasons of 1996-97 and 1997-98.

District	No. of trials	VBG 18	Seed yield (kg ha <sup>-1</sup> )		
			Vamban 1 (ch.)	Vamban 2 (ch.)	CO 5 (ch.)
<i>Rabi</i>					
Coimbatore	4	1016	820	840	903
Cuddalore	4	810	743	780	793
Dharmapuri	3	794	744	662	741
Dindugal	7	860	731	590	647
Erode	6	814	669	858	743
Kancheepuram	4	809	659	614	658
Karur	3	844	727	609	626
Madurai	5	846	776	742	1014
Namakkal	2	700	684	710	677
Salem	8	806	706	758	799
Sivagangai	2	546	463	545	641
Thanjavur	3	548	442	461	413
Theni	3	657	587	653	690
Thiruvannamalai	4	956	838	655	988
Tirunelveli	3	441	331	336	501
Trichy	1	1030	950	1460	1025
Thoothikudi	2	446	357	343	425
Vellore	2	870	717	540	774
Villupuram	1	362	-	-	350
Virudhunagar	3	656	597	588	624
Mean	-	775	675	663	729
% increase	-	-	14.8	16.9	6.3

Table 3c. Performance of black gram culture VBG 18 in adaptive research trials during summer seasons of 1996-97 and 1997-98.

District	No. of trials	VBG 18	Seed yield (kg ha <sup>-1</sup> )		
			Vamban 1 (ch.)	Vamban 2 (ch.)	Co 5 (ch.)
<i>Summer</i>					
Coimbatore	5	703	584	537	536
Cuddalore	3	471	423	425	425
Dharmapuri	3	776	748	773	754
Dindigul	6	1157	1019	1034	918
Erode	1	525	440	530	490
Kancheepuram	5	847	777	672	741
Madurai	3	616	488	622	637
Namakkal	3	903	755	1020	775
Salem	6	1028	825	841	1079
Sivagangai	5	708	633	696	707
Tirunelveli	3	943	834	860	1088
Trichy	926	693	683	-	-
Thoothukudi	4	981	903	916	776
Vellore	4	704	584	576	620
Villupuram	1	805	-	-	643
Virudhunagar	2	595	531	687	606
Mean	-	826	716	755	718
% of increase	-	-	15.4	9.4	15.0
Overall mean	-	774	672	693	689
% increase	-	-	14.5	11.7	12.3