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TNAU Blackgram CO 6: A High Yielding Short Duration Variety

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A high yielding blackgram culture COBG 653 is a cross derivative of DU 2 x VB 20 and matures in 60 - 65 days. This culture recorded an average yield of 877 Kg/ha with a yield increase of 24 per cent over the national checks varieties LBG 402 and LBG 17 under All India Co-ordinated trials. This was released for cultivation during rabi season in south zone consisting of Tamil Nadu, Andhra Pradesh, Karnataka and Odisha. In the state trials, it recorded an average yield of 733 Kg/ha with a yield increase of 13.46 per cent over VBN (Bg) 4, 12.42 per cent over VBN (Bg) 5 and 16.86 per cent over CO 5. It has bold seeds with a mean 100 seed weight of 5.5 grams. It is determinate and has synchronized maturity. It has good batter qualities like high initial batter volume and volume after fermentation. The protein content is 23.8 per cent. It is moderately resistant to mungbean yellow mosaic virus (MYMV), stem necrosis and root rot diseases. It is tolerant to aphids, stemfly and spotted pod borer infestation. This variety was notified recently as per the reference S.O. 632(E) dt. 25.03.2011. It is best suited for cultivation during rabi season in Tamil Nadu.

Key words: Blackgram, *Vigna mungo*, COBG 653, seed yield, short duration, TNAU Blackgram CO 6

Blackgram (*Vigna mungo* (L.) Hepper) is a rich source of protein (20.8 to 30.5 per cent) with total carbohydrates ranging from 56.5 to 63.7 per cent. It is also a good source of phosphoric acid and calcium. It contains a wide variety of nutrients and is popular for its fermenting action and thus it is largely used in making fermented foods. Blackgram, cultivated as a sole crop and intercrop is the third important pulse crop in India, covering an area of about 3.24 milllion hectares and producing 1.46 million tonnes. Productivity is only 526 Kg/ha. In Tamil Nadu, blackgram covers an area of about 3.41 lakh hectares with production of 1.21 lakh tonnes and productivity of 355 kg/ha (Project Co-ordinator's Report, 2011, AICRP on MULLaRP).

The production of blackgram is mostly confined to the Asian countries as their tropical climates and soil type suit its cultivation. The largest producer of this pulse is India followed by Myanmar. But being the largest producer of blackgram does not take India to a comfortable situation, as it is also the largest consumer of the blackgram in the world and its total production is not able to fulfill its domestic consumption demand. The incapability of Indian production to satisfy its domestic demand makes it the largest importer of this pulse as well. In India, the major states that produce blackgram are Madhya Pradesh, Uttar Pradesh, Punjab, Maharashtra, West Bengal, Andhra Pradesh, Odisha, Tamil Nadu and Karnataka. The major constraints in achieving higher yield of this crop are lack of genetic variability, absence of suitable ideotypes for different cropping systems, poor harvest index and susceptibility to pests and diseases. Hence, breeding work was initiated to develop high yielding, short duration variety with synchronized maturity and to increase the productivity of the crop.

Materials and Methods

The blackgram culture COBG 653 was evolved at Department of Pulses, Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore. This is a selection from the cross DU 2 X VB 20. Elite plants with desirable characters which contribute towards high grain yield were selected from F_2 generation onwards. They were evaluated for their sustained performance, homozygosity and the culture COBG 653 was identified as the best. It was evaluated with check varieties in Multi location trial (MLT), Adaptive research trial (ART) , AICRP trials *Viz*., Initial varietal trial (IVT), Advanced varietal trial (AVT) and in on farm trials. Thus, a total of 106 trials were conducted. Besides, the reaction of the culture against important pests and diseases was studied. Based on the standard procedure the grain quality and its consumer acceptability were also analyzed.

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Table 1. Performance of COBG 653 in various trials

Trial	No. of locations	Seed yield (kg/ha)					
		COBG 653	VBN(Bg) 4	VBN(Bg) 5	CO 5	LBG 402	LBG 17
Station	10	633	-	-	525	-	-
MLT	9	587	566	603	521	-	-
IVT - Rabi	5	826	-	-	-	740	712
AVT1 - Rabi	5	818	-	-	-	667	676
AVTII - Rabi	10	931	-	-	-	710	723
IVT - Kharif	8	774	-	-	-	-	-
ART	33	684	668	672	-	-	-
OFT	26	763	-	645	-	-	-
Mean	106	733	646	652	523	707	709
Per cent increase over checks		13.46	12.42	16.86	24.04	23.69	

Results and Discussion

The performance of the culture was tested in South Zone consisted of Tamil Nadu, Andhra Pradesh, Karnataka and Odisha during rabi season. It recorded an average grain yield of 826, 818, 913 Kg/ha in IVT, AVT 1 and AVT II trials,

Table 2. Reaction of blackgram culture COBG 653 against yellow Mosaic Virus disease (1 - 9)

Season / year	COBG 653	VBN(Bg) 4	VBN(Bg) 5	Co 5	TU 17- 4
Vamban					
Kharif 2007	3	1	1	9	-
Rabi 2007	2	-	-	4	1
Coimbatore					
Rabi 2007	1	-	-	4	1
Summer 2008	1	1	1	9	-

respectively. The overall percentage increase over national check varieties *Viz*., LBG 402 and LBG 17 was 24.04 and 23.69, respectively (Table 1). Hence, this culture was released for commercial cultivation during rabi season in South zone.

Table 3. Reaction of blackgram culture COBG 653 against Powdery mildew, stem necrosis and root rot diseases at Coimbatore (Rabi 2007)

Disease	COBG 653	TU 17- 4	Co 5
Powdery mildew (0 to 5)	3	1	5
Stem necrosis (Per cent)	3	6	14.5
Root rot (Per cent)	12	14	46

A total of 106 trials were conducted to evaluate the culture COBG 653. It recorded an average yield of 733 Kg/ha, which is 13.46, 12.42 and 16.86 per cent yield increase over VBN(Bg) 4 , VBN(Bg) 5 and CO 5, respectively (Table 1).

Table 4.Reaction of blackgram culture COBG 653 against spotted pod borer at Vamban (Rabi 2007-08)

Entries	Spotted bod borer damage %
TU 17-4	1.9
COBG 653	2.1
VBN 3 (ch)	4.7
PU 30 (ch)	6.2

Reaction to diseases and pests

The culture COBG 653 was tested for YMV reaction in Vamban and Coimbatore. At Coimbatore, it was found to be resistant both during rabi and summer seasons, whereas in Vamban the reaction was resistant/ moderately resistant (Table 2). This culture was also found to be moderately resistant to stem necrosis and root rot diseases (Table 3).

Table 5. Reaction of blackgram culture COBG 653 against Stem fly at Coimbatore (Rabi 2007-08)

Entries	Stemfly damage (Per cent 15 DAS)	Stemfly damage (Per cent 30 DAS)
TU 17-4	16.3	32.5
COBG 653	12.0	23.7

The culture COBG 653 was evaluated for spotted podborer and stemfly damage. It recorded less damage to spotted pod borer (2.1 per cent) and stemfly (12.0 per cent) when compared to check varieties. This culture had field tolerance to the above pests (Table 4 and 5).

Grain quality

Blackgram is mainly used to make fermented dishes. This culture has good batter characteristics with high initial batter volume and batter volume after fermentation (Table 6). It has good organoleptic traits. It is nutritionally rich with high protein content of 23.8 per cent.

Morphological characters

The blackgram culture COBG 653 matures in 60 – 65 days. It has erect growth habit with a plant height ranging from 30 – 35 cm. Pods are glabrous and ranging from 40 – 47 per plant. The seeds are bold, drum shaped, dull black with a 100 seed weight ranging from 5.0 to 6.2 grams (Table 7).

This culture COBG 653 is having superior features *viz*., high yield, short duration, synchronized maturity, non shattering of pods, bold seeds, good batter qualities and moderately resistant to important pests and diseases. Hence it was released as

Table 6. Physical, batter, protein and organoleptic characters of blackgram culture COBG 653

Varieties	Physical characteristics of dhal					Batter characteristics		Sensory evaluation of Idli		Protein
	Length (cm)	Breadth (cm)	Thickness (cm)	100 dhal weight (gm)	Bulk density (g/cm^3)	Initial volume (ml)	Volume after fermentation (ml)	Taste 9-1	Overall acceptability 9-1	(Per cent)
COBG 653	0.58		0.35	1.11	2.47	0.646	590 605	8.1	7.3	23.8
VBN(Bg) 4	0.56		0.35	1.77	2.27	0.540	530 540	7.8	7.6	21.5
VBN(Bg) 5	0.56		0.36	1.09	2.53	0.647	532 550	7.1	7.5	25.0

Table 7. Morphological features of COBG 653 as per the PPV & FRA, New Delhi

Characteristics	COBG 653	VBN(Bg) 5
Hypocotyl: Anthocyanin colouration	Purple	Purple
Days to 50% flowering	30 -35 days	35 - 40 days
Plant growth habit	Erect	Semi erect
Plant habit	Determinate	Indeterminate
Stem colour	Green with purple splashes	Purple with Green splashes
Stem pubescence	Absent	Present
Terminal leaflet shape	Lanceolate	Lanceolate
Foliage colour	Green	Darkgreen
Leaf vein colour	Green	Green
Leaf pubescence	Absent	Present
Petiole colour	Green with purple splashes	Green with purple splashes
Intensity of green colour of premature pods	Green	Green
Pod pubescence	Absent	Present
Peduncle length	10.0 -11.7 cm long	9.0 - 10.0 cm - long
Pod length	4.0 - 4.4 cm - small	4.0 - 4.6 cm - small
Colour of mature pod	Black	Brown
Plant height	30 – 35 cm	35 – 40 cm
Seed colour	Black	Black
Seed lustre	Dull	Dull
Seed shape	Drum shaped	Drum shaped
Seed size (weight of 100 seeds)	5.0 to 6.2 g	4.5 to 5.4 g
Biometrical traits		
Maturity days	60-65	65-70
No.of branches/plant	3-4	3-4
No.of clusters/plant	12 -14	9 -12
No.of pods/plant	40-47	30 -35
No. of seeds/pod	6 -7	6 -7

central variety for commercial cultivation for rabi season in South zone. It was also released as TNAU blackgram CO 6 in the year 2010 for large scale cultivation in Tamil Nadu. This variety was notified recently as per the reference S. O. 632(E) dt. 25.03.2011.

Reference

Project Co-ordinator's Report. 2011. AICRP on MULLARP, Indian Institute of Pulses Research, Kanpur.

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