



# **Assessment of the Performance of High Yielding Blackgram Varieties in Dharmapuri District, Tamil Nadu, India**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

An on farm trial was conducted to study the performance of improved blackgram varieties under rainfed condition of Dharmapuri district. The trial was conducted in five farmers' holdings spread over in palacode and morappur blocks. The varieties included in the study were VBN 8, TBG 104 and VBN 5. The crop was raised and maintained by following the recommended package of practices. Results of the study revealed that the variety TBG 104 recorded higher grain yield of 8.22 q/ha, it was followed by VBN 8 (7.78 q/ha) and lower in farmers practice i.e., VBN 5 (6.90 q/ha). Per cent incidence of yellow mosaic virus disease was lower in TBG 104 (2.67) and higher in farmers practice (15.3). The highest net return (Rs. 21870/ha) and benefit cost ratio (2.14) were realized with TBG 104 and the lowest net return (Rs. 16990/ha) and benefit cost ratio (1.97) were realized with

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farmers practice i.e., VBN 5. Hence, it is concluded from the present study that the blackgram variety TBG 104 can be recommended for cultivation in large scale in Dharmapuri district for realizing higher yield and income by farming community.

**Keywords:** Blackgram; grain yield; yellow mosaic virus; net return; benefit cost ratio.

## 1. INTRODUCTION

Blackgram (*Vigna mungo* L.) also known as urd bean is one of the most important grain legume crop cultivated in India. It contains high protein (26%), carbohydrates (60%), fat (1.5%) and substantial amount of minerals, amino acids and vitamins. It is also called as 'poor man's meat' particularly for the vegetarian population of the Indian subcontinent [1]. Being a short duration legume crop, it can grow under adverse weather conditions and marginal soils. It improves soil fertility by fixing atmospheric nitrogen (22 kg/ha) in soil through symbiotic association. Also, it is used as nutritive green fodder for dairy animals. It is a good green manure crop also acts as a cover crop and thereby prevents soil erosion.

In India, blackgram is being cultivated in about 46 lakh ha with the production of 24.5 lakh tonnes and productivity of 533 kg per hectare. In Tamil Nadu, it is cultivated in 3.72 lakh ha with the production of 1.26 lakh tonnes. In Dharmapuri district, it is cultivated in an area of about 6000 ha with average yield of 721 kg ha<sup>-1</sup>. About 90 per cent of the area under blackgram is being cultivated under rainfed condition during *kharif* season. Prevailing weather parameters such as rainfall, temperature, soil moisture and solar radiation during the different crop growth stages play an important role in deciding the yield of blackgram. The productivity of blackgram under rainfed condition is low due to occurrence of moisture stress, continuous cultivation of older varieties and incidence of yellow mosaic virus disease. Due to the uncertainty in rainfall, occurrence of moisture stress at critical crop growth stages leads to reduction in yield. Apart from moisture stress, lack of knowledge on the availability of suitable high yielding varieties, non availability of good quality seeds, poor filling of pods, incidence of yellow mosaic virus and leaf crinkle disease also affect the blackgram productivity. Hence, on farm trial was conducted to assess the performance of improved blackgram varieties in farmers' holdings with the local variety.

## 2. MATERIALS AND METHODS

To overcome the problems, an on farm trial was conducted in five locations spread over in Palacode, Morappur blocks to assess the suitability of varieties for rainfed situation of Dharmapuri district. The technological options includes Blackgram varieties viz., TO 1 - Farmers Practice (VBN 5), TO 2 - VBN 8, TO 3 - TBG 104 were taken for the study. The characteristics of the varieties taken up for the study are given in Table 1.

The Blackgram crop was raised during *kharif* season 2017 coinciding with south west monsoon. During that season, the district received 395 mm rainfall which was 9.4 per cent higher than the normal rainfall. The soil of the trial plots were sandy loam in texture, non saline, slightly alkaline in soil reaction, low in available nitrogen (<280 kg/ha) and medium in available phosphorus (11-22 kg/ha) and potassium (118-280 kg/ha). The seeds were treated with *Rhizobium* @ 20 g/kg seed and *Trichoderma viride* @ 4 g/kg seed at the time of sowing and the seeds were sown at 30 x 10 cm spacing. Integrated nutrient management practices including basal application of FYM @ 12.5t/ha, recommended dose of NPKS @ 25:50:25:20 kg/ha, soil application of TNAU pulses micronutrient mixture @ 7.5 kg/ha were followed. Foliar spraying of pulse wonder @ 5 kg/ha at peak flowering stage was done. As pulse wonder contains nutrients and growth regulators spraying of it decreases the flower shedding and enhances the yield. Integrated pest and disease management practices were followed as per the TNAU crop production guide 2014. Incidence of yellow mosaic virus and leaf crinkling disease was observed during the crop growth stages. At the time of harvest, the growth and yield characters such as number of pods per plant, number of seeds per pod, 100 seed weight (g) and grain yield (q/ha) were recorded both under demonstration and farmers practice. Economic analysis was done by calculating cost of cultivation, gross income, net income and benefit cost ratio.

**Table 1. Characteristics of the blackgram varieties**

| Particulars               | VBN 8  | TBG 104  | VBN 5  |
|---------------------------|--|--|--|
| Year of release and state | Released from Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu during 2016 | Released from Regional Agricultural Research Station, Tirupati, Andhra Pradesh during 2016 | Released from Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu during 2006 |
| Duration                  | 65-70 days   | 75-80 days   | 65-70 days   |
| Special features          | Resistant to yellow mosaic virus disease   | Photo insensitive and resistant to yellow mosaic virus disease                             | Moderately resistant to yellow mosaic virus disease                                  |

### 3. RESULTS AND DISCUSSION

The data on incidence of disease, growth and yield parameters is presented in Table 2. The results revealed that the plant height (49.2 cm), number of pods (29.6/plant), pod length (5.28 cm) and number of seeds per pod (8.00) were higher in TBG 104. The lower plant height (38.2 cm), number of pods per plant (21.9), pod length (4.90 cm) and number of seeds per pod (6.64) were observed in farmers practice i.e., VBN 5. Significantly higher 100 seed weight (5.24 g) was observed in TBG 104 and lower (4.26 g) in farmers practice. The variation in plant growth and yield attributes among the varieties might be due to their genetic variability. Similar results were reported by Goswami et al. [2], Verma et al. [3] and Bhowal and Bhowmik [4] in Greengram.

Besides, per cent incidence of yellow mosaic virus (2.67) and leaf crinkling disease (2.33) was lower in TBG 104. The per cent incidence of yellow mosaic virus (15.3) and leaf crinkling disease (18.6) was higher in farmers practice.

The data on grain yield indicated that, irrespective of the locations among the blackgram varieties

studied Technology option 3 i.e., TBG 104 recorded higher grain yield in all the five locations (Fig. 1). The mean data revealed that, the variety TBG 104 recorded higher grain yield of 8.22 q/ha, it was followed by VBN 8 (7.78 q/ha) and lower in farmers practice i.e., VBN 5 (6.90 q/ha) (Table 3). The overall increase in growth and yield attributes is mainly due to the lower incidence of pest and diseases. Similar findings of yield variation over different varieties were reported by Reddy et al. [5], Archana et al. [6] and Sunil et al. [7] in blackgram.

Data on economics indicated that gross cost was higher in TBG 104 and VBN 8 (Rs. 19220/ha) and lower in farmers practice i.e., VBN 5 (Rs. 17490/ha). Blackgram variety TBG 104 has realized the higher gross return (Rs. 41090/ha), net return (Rs. 21870/ha) and benefit cost ratio (2.14). The farmers practice i.e., VBN 5 realized the lower gross return (Rs. 34480/ha), net return (Rs. 16990/ha) and benefit cost ratio (1.97). The reason for higher net return and benefit cost ratio might be due to higher grain yield obtained in TBG 104 variety. Similar findings were reported by Sangeetha et al. [8] in chickpea.

**Table 2. Growth performance of the improved varieties of Blackgram**

| Parameters                        | TO 1- Farmers Practice (VBN 5) | TO 2- VBN 8 | TO 3 – TBG 104 |
|-----------------------------------|--------------------------------|-------------|----------------|
| Plant height (cm)                 | 38.2                           | 43.6        | 49.2           |
| Days to 50% flowering             | 36                             | 32          | 38             |
| Number of pods per plant          | 21.9                           | 26.4        | 29.6           |
| Pod length (cm)                   | 4.90                           | 5.24        | 5.28           |
| Number of seeds per pod           | 6.64                           | 7.66        | 8.00           |
| 100 Seed weight (g)               | 4.26                           | 4.81        | 5.24           |
| Seed colour                       | Black                          | Black       | Greenish Black |
| Yellow Mosaic Virus incidence (%) | 15.3                           | 3.33        | 2.67           |
| Leaf crinkling incidence (%)      | 18.6                           | 4.00        | 2.33           |

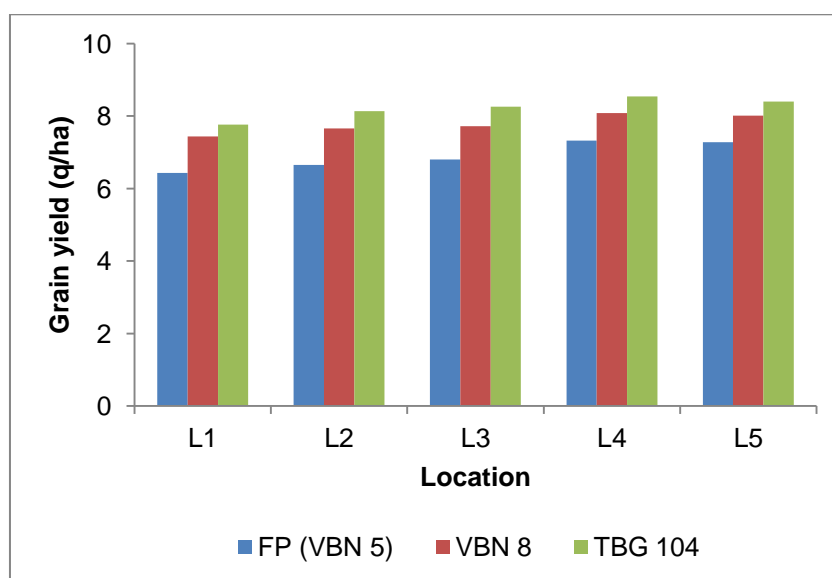


Fig. 1. Grain yield of Blackgram varieties

Table 3. Grain yield and economics of improved varieties of Blackgram

| Technology Option               | No. of trials | Grain yield (q/ha) | Gross Cost (Rs./ha) | Gross return (Rs./ha) | Net return (Rs./ha) | B:C Ratio |
|---------------------------------|---------------|--------------------|---------------------|-----------------------|---------------------|-----------|
| TO 1 : Farmers practice (VBN 5) | 5             | 6.90               | 17490               | 34480                 | 16990               | 1.97      |
| TO 2 : Cultivation of VBN 8     |               | 7.78               | 19220               | 38910                 | 19690               | 2.02      |
| TO 3 : Cultivation of TBG 104   |               | 8.22               | 19220               | 41090                 | 21870               | 2.14      |

#### 4. CONCLUSION

Based on the study, the blackgram variety TBG 104 performed superior with respect to yield and income of the farmers. Farmers opined that the seeds of the variety TBG 104 are bold and plants are bushy. It also, showed resistance to yellow mosaic virus and leaf crinkling disease. Hence, blackgram variety TBG 104 can be recommended for large scale cultivation under rainfed condition during *kharif* season for realizing higher return.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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