



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(4): 2923-2925
Received: 01-05-2018
Accepted: 05-06-2018

S Vennila
Department of Genetics and
Plant Breeding, Faculty of
Agriculture, Annamalai
University, Annamalai Nagar,
Chidambaram, Tamil Nadu,
India

M Pushpakaran
Department of Genetics and
Plant Breeding, Faculty of
Agriculture, Annamalai
University, Annamalai Nagar,
Chidambaram, Tamil Nadu,
India

K Palaniraja
Department of Genetics and
Plant Breeding, Faculty of
Agriculture, Annamalai
University, Annamalai Nagar,
Chidambaram, Tamil Nadu,
India

Correspondence
S Vennila
Department of Genetics and
Plant Breeding, Faculty of
Agriculture, Annamalai
University, Annamalai Nagar,
Chidambaram, Tamil Nadu,
India

Effect of presowing seed pelleting treatment using botanical leaf powders and biofertilizers on growth and yield characters in blackgram (*Vigna mungo* [L.] Hepper) variety VBN 5

S Vennila, M Pushpakaran and K Palaniraja

Abstract

Field experiment was conducted to study the effect of seed pelleting using plant leaf powders and biofertilizers on seed quality parameters of blackgram. Pelleting is one of the physical presowing seed management techniques, in which individual seed are enriched with bio active substances on the seed surface to enhance the vigour of the seed. The seeds of blackgram were given pelleting treatments viz., neem leaf powder, pungam leaf powder, prosopis leaf powder, nochi leaf powder, rhizobium biofertilizer, azospirillum biofertilizer and sown along with control. The results revealed that pungam leaf powder 200g per kg recorded the higher values for growth and yield parameters when compared to control.

Keywords: blackgram VBN 5, plant leaf powders, biofertilizers, seed pelleting, seed yield

Introduction

Blackgram (*Vigna mungo* L.) is the most important pulse crop in India and ranks fourth among the major pulse crop cultivation. Blackgram plays a major role in supplying a balanced protein component and vegetarian diet. Blackgram is cultivated both in *kharif* and *rabi* season in India have an area about 3.24 lakh hectares and production of 1.95 lakh tonnes.

The major constraint in blackgram is low productivity which may be due to the poor soil moisture, poor crop production and low soil fertility. The low productivity is due to the fact that pulses are grown mostly in marginal and rain fed areas. The main constraint in raising the productivity levels of pulses in dry land agriculture is the inadequacy of soil moisture and poor fertility status of the soil. To overcome the adverse environmental conditions like low rainfall & low soil moisture which prevent the germination & seedling establishment, seed pelleting is given as a presowing seed treatment which act as a boon to the farmers in dryland agriculture. Applications of nutrients to the dryland is a problematic one, by giving the nutrients to the seed itself as presowing treatment will improve the viability and vigour of the seed and that will give good yield (Vijaya, 1996) [13]. It proven to be a reliable performer in low and high rainfall areas and in all soil types. It is an affordable and effective way to optimize early growth and yield potential. It is also one of the lowest financial investments through which a grower can make to maximize productivity and improve the bottom line.

Seed pelleting is the process of enclosing a seed with small quantity of inert material just large enough to produce globular unit of standard size to provide small amount of nutrients to young seedlings (Krishnasamy, 2003) [3]. This technique is acclaimed to play a vital role in modern agriculture for precision planting and also for supplementary nutrition through which uniform and vigorous field standards possible. It reduces the problem of thinning, gap filling and chemicals required (Manjunath *et al.*, 2009) [5]. In addition pelleting with organic leaf powders said to improve the water holding capacity of soil at the region of root formation and improve the supply of nutrients to the germinating seed (Srimathi *et al.*, 2013) [12]. Hence the present study was undertaken to evaluate the various seed pelleting treatments on growth and yield characters of blackgram variety VBN 5.

Materials and Methods

The present investigation was carried out by using genetically pure seeds of blackgram variety VBN 5 obtained from National Pulse Research Station, Vamban, Pudukottai. The bulk seeds were cleaned manually to remove unwanted material from the seed lot. Pot culture experiment was conducted at the pot culture yard in Department of Genetics and plant Breeding, Faculty of Agriculture, Annamalai University, Chidambaram.

Preparation of treatments for seed pelleting

The fresh leaves were collected separately and dried under shade condition. The shade dried leaves were powdered using mortar and pestle. A fine leaf powder was obtained by sieving through 0.10 mm wire mesh remove unwanted material and leaf debris. Biofertilizers *viz.*, rhizobium and azospirillum were added at the recommended level.

Treatment details

T₀ - Control

T₁ - Seed pelleting with neem leaf powder @ 200g / kg

T₂ - Seed pelleting with pungam leaf powder @ 200g / kg

T₃ - Seed pelleting with prosopis leaf powder @ 200g / kg

T₄ - Seed pelleting with nochi leaf powder @ 200g / kg

T₅ - Seed pelleting with biofertilizer rhizobium @ 200g / kg

T₆ - Seed pelleting with biofertilizer azospirillum @ 200g / kg

Pot culture experiment was conducted to study the effect of pre sowing seed pelleting using various leaf powders and biofertilizers on growth and yield characters in blackgram. Observations were recorded on growth and seed yield characters *viz.*, days to 50% flowering, plant height (cm), number of leaves per plant, number of branches per plant, number of clusters per plant, number of nodules per plant, number of pods per plant, pod length (cm), number of seeds per pod, 100 seed weight (g) and seed yield per plant (g). The data collected were statistically scrutinized as per Panse and Sukhatme (1985) [7] for understanding the significance at 0.5 percent.

Results and Discussion

In pelleting process, the seeds are stamped using an adhesive

and are filled with filler material are rolled in uniformity. The success of pelleting depends on the selection of filler material. Researchers expressed the beneficiary influence of different filler material such as leaf powder (Khatun *et al.*, 2011) [2], biofertilizer (Selvakumar *et al.*, 2012) [10] and combination of all these for obtaining improved planting value. In the present investigation, the blackgram seeds were pelleted with leaf powders and biofertilizers recorded highly difference among the seed pelleting treatments. Malarkodi (2003) [4] opined that the macro and micronutrients present in the leaf powder also the cause for invigourative effect of botanicals treatments. Pungam leaf powder contains plant mineral nutrients like nitrogen (5.6%), phosphorus (P₂O₅-0.9%), Potassium (K₂ O-3.11%) and Calcium (Ca 0-1.0%) (Nadeem Binzia, 1992) [6]. In field evaluation seed quality characters as highlighted in Table 1 and 2 seed pelleting with pungam leaf powder recorded higher values than compared to control in the following characters *viz.*, Days to 50% flowering (31.33days), plant height (35.93cm), numbers of leaves per plant (17.00), numbers of branches per plant (5.67), numbers of clusters per plant (12.67), numbers of pods per plant (26.33), pod length (4.73cm), number of seeds per pod (6.67), 100 seed weight (5.75g) and seed yield per plant (5.31g). Similar observations with increased yield parameters were reported by Prakash *et al.* (2013) [8], Sathiya Narayanan *et al.* (2014) [9] and Georgin Ophelia (2017) [11] reported that pelleting with pungam leaf powder @ 150 g kg⁻¹ of seeds enhanced in both growth and yield parameters in blackgram. Rhizobium biofertilizer (T₅) recorded the highest number of nodules per plant (17.33). Similar results recorded in green gram pelleted seeds (Srimathi *et al.*, 2007) [11].

Table 1: Effect of seed pelleting treatment on plant growth characters in variety Vamban 5

Treatment (T)	Days to 50% flowering	Plant height (cm)	Number of leaves per plant	Number of branches per plant	Number of clusters per plant	Number of nodules per plant
T ₀	36.33	29.77	12.33	3.67	6.67	12.00
T ₁	34.00	32.73	14.67	4.33	10.83	14.33
T ₂	31.33	35.93	17.00	5.67	12.67	16.67
T ₃	32.00	34.87	16.33	5.33	12.00	16.00
T ₄	35.33	31.53	12.67	4.00	8.00	13.67
T ₅	33.00	32.93	16.00	4.67	10.00	17.33
T ₆	32.67	34.10	15.00	5.00	8.67	15.67
Mean	33.52	33.12	14.86	4.67	9.76	15.09
SE	0.6424	0.9361	0.6424	0.3984	1.0389	0.6667
CD (P=05)	1.3780	2.0078	1.3780	0.8546	2.2285	1.4300

Table 2: Effect of seed pelleting treatment on plant yield characters in variety Vamban 5

Treatment (T)	Number of pods per plant	Pod length (cm)	Number of seeds per pod	100 seed weight (g)	Seed yield per plant (g)
T ₀	20.67	4.10	4.00	4.25	4.38
T ₁	23.00	4.40	5.00	5.08	5.00
T ₂	26.33	4.73	6.67	5.75	5.31
T ₃	25.33	4.63	5.67	5.40	5.23
T ₄	22.00	4.27	4.33	4.92	4.95
T ₅	25.00	4.53	4.67	5.13	5.08
T ₆	24.00	4.50	5.33	5.24	5.15
Mean	23.76	4.45	5.09	5.11	5.01
SE	0.6901	0.0943	0.3984	0.0380	0.0303
CD (P=05)	1.4802	0.2022	0.8546	0.0816	0.0651

Conclusion

The study revealed pelleted seeds had improved photosynthetic efficiency of the plant and also improve the nodulation which are essential for enhanced productivity. Pungam leaf powder are highly suitable for seed pelleting as filler material in pelleting and has proved to have

invigourative influence on seed quality characters that was sustained at field. Use of chemicals as pelleting materials are costly and causes natural hazard, where as botanicals are less costly, easily available to the formers, safe to handle and they can prepare easily. However the present results revealed that

seeds pelleted with pungam leaf powder performed better than unpelleting and were followed by prosopis leaf powder.

References

1. Georin Ophelia A. Studies on the effect of seed pelleting and foliar spray treatments on seed yield and quality in blackgram (*Vigna mungo* L.) cv. CO 6. M.Sc. (Ag.) Thesis, Annamalai University, Annamalainagar, Tamilnadu, 2017.
2. Khatun A, Kabir G, Bhuiyan MAH, Khanam D. Effect of preserved seeds using different botanicals on seed quality of lentil. Bangladesh J Agric. Res. 2011; 36(3):381-387
3. Krishnasamy V. Seed pelleting-Principles and Practices. ICAR Short Course on Seed Hardening and Pelleting Technologies for Rainfed/Garden Land Ecosystems, Tamil Nadu Agricultural University, Coimbatore, 2003, 96.
4. Malarkodi K. Integrated management techniques for seed storage in greengram (*Vigna radiata* L. Wilczek). Ph.D. Thesis, Tamil Nadu Agricultural University, Coimbatore, 2003.
5. Manjunath SN, Despande VK, Shridevi O, Upper DS, Babalad HB, Rao MSL. Karnataka J Agril. Sci. 2009; 22(4):762-764.
6. Nadeem Binzia. Investigation of the chemical constituents of *Prosopis julifera* and circular Dichroismic studies of cholestano Quinaxaliner. Ph.D Thesis, University of Karachi, Pakistan, 1992.
7. Panse VG, Sukatme PV. Statistical methods for agricultural workers. ICAR publication, New Delhi, 1985, 359.
8. Prakash M, Sathiya Narayanan G, Sunil Kumar B, Kamaraj A. Effect of seed hardening and pelleting on seed quality and physiological of rice in aerobic condition. Agric. Sci. Digest. 2013; 33(3):172-177.
9. Sathiya Narayanan GB, Sunil Kumar, Prakash M, Anandan R. Effect of pre- sowing herbal hardening treatment on initial seed quality parameters in sesame (*Sesamum indicum* L.) cv. TMV 3. Intl. J Rent Res. 2014; 11:10387-10393.
10. Selvakumar G, Reetha S, Thamizhiniyan P. Response of biofertilizers on growth, yield attributes and associated protein profiling changes of blackgram (*Vigna mungo* L. Hepper). World Appl. Sci. J. 2012; 16(10):1368-1374.
11. Srimathi P, Kavitha S, Renugadevi J. Influence of seed hardening and pelleting on seed yield and quality in green gram (*Vigna radiata* L.) cv. CO 6. Indian J Agric. Res. 2007; 41(2):122-126.
12. Srimathi P, Mariappan N, Sundaramoorthy L, Paramathma M. Effect of organic seed pelleting on seed storability and quality seedling production in biofuel tree species. J of Horti. and Forestry. 2013; 5(5):68-73.
13. Vijaya J. Standardization of pre-sowing seed management techniques for pulses M.Sc. (Ag.) Thesis, Tamil Nadu Agricultural University, Coimbatore, 1996.