

EFFECT OF DIFFERENT LEVELS OF UPTAKE STIMULANTS ON THE YIELD OF DOLICHOS BEAN (LABLAB PURPUREUS)

ABSTRACT

This case study investigates the impact of different levels of uptake stimulants on the growth and yield of a leguminous vegetable crop Dolichos bean (*Lablab purpureus*). The field experiment was conducted during the Rabi season of 2023 at agricultural land of ASPEE Foundation based in Palghar, Maharashtra. The study utilized a Randomized Block Design (RBD) with three replications, each drenched with seven different well-formulated nutrients. The highest pod yield was recorded 2187 ton/ha with the application of 2 ml P star used with per Liter of water. This indicates that application of appropriate treatments using appropriate crop protection equipment with integrated nutrient management (INM) significantly enhanced both growth and yield parameters of Dolichos bean such as Number of Pods per Cluster, Pod Weight, Number of Seeds per Pod, Pod Yield per Plant, Pod Yield (kg/ha) etc.

Aims: This study investigates the effectiveness of different levels of uptake stimulants on the growth and yield of a leguminous vegetable crop Dolichos bean (*Lablab purpureus*) of Bauni Variety, focusing on identifying the most effective treatment for improving growth and yield parameters.

Study design: The study utilized a Randomized Block Design (RBD) with three replications, each drenched with seven different well-formulated nutrients.

Place and Duration of Study: The field experiment was conducted during the Rabi season of 2023 at agricultural land of ASPEE Foundation based in Palghar, Maharashtra, India.

Methodology: Each test plot size was prepared with 4.5 m x 1.2 m, keeping plant spacing 60 cm x 45 cm. The treatments involved varying levels of two commercially available organic proprietary formulations based on active herbal and natural ingredients namely P star and Drip K plus, alongside a recommended control group of NPK.

Results: The highest pod yield was recorded 2187 ton/ha with the application of 2 ml P star used with per Liter of water. This indicates that application of appropriate treatments using appropriate crop protection equipment with integrated nutrient management (INM) significantly enhanced both growth and yield parameters of Dolichos bean such as Number of Pods per Cluster, Pod Weight, Number of Seeds per Pod, Pod Yield per Plant, Pod Yield (kg/ha) etc.

Conclusion: The application of uptake stimulants significantly influenced the growth and yield of Dolichos bean. Among all the treatments, P star at 2 ml/ liter of water (T2) proved to be the most effective, leading to superior growth and yield parameters. This suggests that active herbal and natural ingredients concentration can be recommended as an effective stimulant for enhancing Dolichos bean productivity, but could also be recommended for other similar crops. Environment concerns must place on top priority while managing any crops.

Keywords: Dolichos bean, INM, Randomized Block Design, leguminous crop, plant protection equipment

1. INTRODUCTION

Mosly in south Asian countries like India, Nepal, Pakistan, Bangladesh, Sri Lanka, where the green and tender pods are highly popular commonly consumed as vegetables, while their dry seeds are used as pulses. Dolichos bean (*Lablab purpureus* L.) is a leguminous belongs to family Fabaceae with $2n=22$ chromosomes (Goldblatt, 1981; She and Jiang, 2015). It is identified by many different names across the world. In India, it is popularly known as SEM, Wal, Avare, Avarai, etc., whereas in Western countries, it is referred to as the Bonavist bean, possibly due to its ornamental effect when in full bloom (Ayyangar and Nambiar, 1935).

It is also known as Lablab bean, Hyacinth bean, or Egyptian kidney bean or sem, is a versatile leguminous vegetable that can be consumed both as green beans and dry seeds (parmar et al.2013).

In recent years, fast growing population has increased the demand of pulses and vegetables along with staple food grains.

It could be one of the best solutions for meeting the continuously rising demands. It is mostly cultivated in the tropical regions of Asia, Africa, and Australia. Belonging to the Fabaceae family, Dolichos bean is renowned for its nutritious pods and seeds, with protein content ranging from 10-19% in pods and 15-25% in seeds. Additionally, the plant's foliage serves as hay, silage, and green manure, contributing to sustainable agricultural practices. It is photo-sensitive and grown both short day and long day types (Anonymous, 1961).

Due to its adaptability and drought resistance, Dolichos bean can thrive under various environmental conditions, making it a vital crop in regions such as Karnataka, Tamil Nadu, Andhra Pradesh, and Maharashtra. The crop's ability to fix nitrogen enriches soil fertility, enhancing subsequent crop yields. Effective soil nutrient management, particularly the application of nitrogen, phosphorus, and potassium, is crucial for optimizing the growth, yield, and quality of Dolichos bean crops.

Jaisankar and Manivannan (2018) observed increasing levels of N significantly increased the growth and yield parameters of dolichos bean.

Ananth and Kumar (2018) studied the effect of organic and inorganic sources of nutrients in combination with consortium biofertilizers on growth, yield and quality of dolichosbean.

Ullasa et al (2018) described the long term effect of INM practices on growth and yield of Dolichos bean along and also the soil properties.

Most recently, Venkatesan et al (2024) studied the effect of season and genotypes, found season of sowing had a significant influence on green pod yield, crude fibre, crude protein and total dry matter production in Dolichos bean.

This study aims to evaluate the effectiveness of different levels of uptake stimulants drenching in enhancing the yield of Dolichos bean, focusing on identifying the most effective treatment for improving growth and yield parameters.

2. MATERIAL AND METHODS

2.1 Experimental Site

The experiment was conducted during the Rabi season of 2024 at the ASPEE Foundation, Palghar, North Konkan region in the state Maharashtra, India. This region experiences a tropical climate, characterized by moderate temperature range (40.6 oC max.- 8.3 oC min.) and average rainfall is about 2458 mm. which are conducive to the cultivation of Dolichos bean (Govt.of Maharashtra).

2.2 Experimental Design

The study employed a Randomized Block Design (RBD) with seven treatments following with T1 to T7 and three replications. The treatments involved varying levels of two commercially available organic proprietary formulations based on active herbal and natural ingredients namely P star and Drip K plus, alongside a control group.

P Star (herbal extent 1%) stimulates plants to absorb the required phosphorus from the soil whereas Drip K Plus stimulates plants to absorb required nutrients like Potash (K), Calcium (Ca), Magnesium (Mg), Zinc (Zn), Boron (B), Iron (Fe), Silica (Si) and other Micro & Macro nutrients available in the soil. Stimulation of Plants, Increased Elasticity of Roots, and Cation Exchange Mechanism are assumed modes of action of this product (farmsons.in). The Dolichos bean variety 'Bauni' was selected for this experiment.

2.3 Treatment Details

The following formulation of treatments were applied to assess the growth and yield parameters.

Treatment No. Treatment Details

- T1: P star @ 1 ml per liter water
- T2: P star @ 2 ml per liter water
- T3: P star @ 3 ml per liter water
- T4: Drip K plus @ 1 ml per liter water
- T5: Drip K plus @ 2 ml per liter water
- T6: Drip K plus @ 3 ml per liter water
- T7: Control

2.4 Experimental Layout

The following matrix show the description of experimental layout.

Crop: Dolichos bean

Variety: Bauni

Spacing: 60 cm x 45 cm

Plot size: 4.5 m x 1.2 m

Date of sowing: 24/01/2024

2.5 Data Collection

Growth parameters such as plant height, number of branches per plant, pod length, and pod girth were recorded periodically. Yield parameters including the number of pods per cluster, pod weight, number of seeds per pod, pod yield per plant, and overall pod yield (kg/ha) were also measured.

3. RESULTS AND DISCUSSION

Refer to Table 1, The study revealed significant variations in growth and yield parameters across different treatments. Treatment T2, which involved the application of P star at 2 ml per liter of water, consistently outperformed other treatments in terms of both growth and yield.

Table 1. Effect of different levels of stimulants drenching on the yield of Dolichos bean

	Plant height (cm)	No. of branches per plant	No. of pods per cluster	Pod length (cm)	Pod Girth (cm)	Pod weight (g)	No. of seed per pod	Pod Yield per plant	Pod Yield (q/ha)
T1	92.6	8	7.9	9.13	1.4	7.81	7.7	504.6	19.55
T2	100.6	8.8	8.7	10.6	1.87	8.6	8.4	573.5	21.87
T3	95.8	8.4	8.3	9.7	1.53	8.17	8.1	528	20.62
T4	88.9	7.5	7.5	8.83	1.3	7.55	7.3	475	17.45
T5	86.1	7.1	7.1	8.53	1.17	7.27	6.9	447.2	16.33
T6	82.4	6.8	6.5	8.13	1.07	6.89	6.5	424.1	15.14
T7	77.2	5.3	5.5	7.13	0.8	6.06	5.7	332.2	12.52
S.Em.±	1.04	0.12	0.15	0.16	0.05	0.11	0.07	8.85	0.37
C.D.	3.22	0.36	0.45	0.51	0.14	0.35	0.21	27.27	1.13

3.1 Growth and Yield Parameters

Dolichos bean crops are highly photoperiod sensitive. They have significant effect on days to flowering requires long nights and short-days for switching over from vegetative to reproductive phase (Ayyangar and Nambiar 1935).

Plant Height: The highest plant height (100.6 cm) was recorded in treatment T2. It has directly or indirectly effect on magnitude of many traits such as branches per plant, number of clusters per plant, number of pods per plant, pod yield per plant etc.

Number of Branches per Plant: Treatment T2 also led to the average highest number of branches per plant (8.8).

Pod Length and Girth: The longest pods (10.6 cm) and the greatest pod girth (1.87 cm) were observed again in treatment T2.

Number of Pods per Cluster: Treatment T2 resulted in the highest number of pods per cluster (8.7).

Pod Weight: The highest pod weight (8.6 gm) was recorded in treatment T2.

Number of Seeds per Pod: Treatment T2 had the most seeds per pod (8.4).

Pod Yield per Plant: Treatment T2 achieved the highest pod yield per plant (573.5 kg).

Pod Yield (kg/ha): Treatment T2 recorded the highest overall yield of 21.87 q/ha.

Similar results were reported by Kumar et al. (2013); Jaisankar and Manivannan (2018); Ananth and Kumar (2018); Ullasa et al (2018).

4. CONCLUSION

The application of uptake stimulants significantly influenced the growth and yield of Dolichos bean. Among all the treatments, P star at 2 ml/ liter of water (T2) proved to be the most effective, leading to superior growth and yield parameters. This suggests that active herbal and natural ingredients concentration can be recommended as an effective stimulant for enhancing Dolichos bean productivity, but could also be recommended for other similar crops. Environment concerns must place on top priority while managing any crops.

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