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Effect of Organic Spray on Growth Characters of Dolichos Bean (*Lablab purpureus*) var. Co (Gb)-14

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A B S T R A C T

A field experiment was conducted in 2020 at farmer's field in varagoorpatai village, Cuddalore, Tamil Nadu to study the influence of plant growth regulators on growth characters of Dolichos bean *(Lablab purpureus (L)* Sweet*)*. The experiment was laid out in Randomized Block Design with three replications and eleven treatments. The treatment combination consisted of inorganic fertilizer (DAP) and Plant bio regulators (Panchagavya, Vermiwash, Effective Micro organism and Seaweed extract). The treatment details *viz.*, T_1 - RDF (control), T_2 - INM (Without foliar application), T_3 - INM + DAP @ 2%, T_4 - INM + Panchagavya @ 3%, T_5 - INM + Panchagavya @ 4%, T_6 - INM + Vermiwash @ 1:5 dilution, T_7 - INM + Vermiwash @ 1:7.5 dilution, T_8 - INM + Effective Micro organism @ 1:1000 dilution, T_9 - INM + Effective Micro organism @ 2.5:1000 dilution. T_{10} - INM + Seaweed extract @ 2.5% foliar spray, T_{11} - INM + Seaweed extract @ 5%. The foliar sprays were applied at 30, 60 and 75 DAS. Studies revealed that the growth characters of dolichos bean differed significantly due to foliar spray treatments of different organic nutrients. Among the different foliar treatments, seaweed extract spray @ 5% recorded significant highest plant height (96.13 cm), total chlorophyll in fresh leaf tissue (2.57 mg g^{-1}), Leaf area (20.00 cm^2), leaf area index (8.02) and Days to first flowering (27.01 das), followed by T_{7}- INM + Vermiwash @ 1:7.5 dilution and $T_{10.}$ - INM + Seaweed extract @ 2.5% foliar spray.

Introduction

Dolichos bean *(Lablab purpureus (L)* Sweet*)*. belongs to the family Leguminosae, is one of the important vegetable valued for its proteins, minerals and energy. The crop is gaining popularity among vegetable growers due to higher remuneration and steady market demand. However, poor productivity level with traditional practices impairs wider acceptability of the crop. There is a tremendous scope to increase the current productivity level by adopting innovative practices. Different treatments of plant growth regulators were found effective in increasing the growth parameters through enhanced biomass production and translocation of assimilates toward developing sink. In addition to organic regulators like Seaweed (Sivasankari *et al.*, 2006), Vermiwash (Kaur *et al.*, 2015), Panchagavya (Swaminathan *et al.*, 2007), Effective micro organism (Chaudhary *et al.*, 2006) and

Diammonium Phosphate (Kuldeep Singh *et al.*, 2015) are also emerging as plant booster for improving the physiological efficiency of the crop. In light of the fact, the present experiment was undertaken to study the influences of certain plant growth regulators on growth characters of Dolichos bean and to identify the most suitable combination of organic nutrients is along with INM.

Materials and Methods

The study was conducted during 2020 at farmer field in Varagoorpatai village, Cuddalore, Tamil Nadu (11^0 24' N latitude, 70°41' E longitude and ± 5.79 m MSL above mean sea level). The soil was sandy loamy in texture, alkaline in reaction (pH 5.74) low in available nitrogen (53.0 kg ha^{-1}), higher in available phosphorus (31.0 kg P_2O_5/ha) and higher in potassium (145.0 kg K_2O/ha) respectively. The Dolichos bean (cv. Co (Gb)-14) seeds were sown during mid December in 30 x 60 cm plant spacing. Five different growth regulators namely Diammonium Phosphate (2%), Panchagavya (3 and 4%), Vermiwash (1:5 and 1:7.5 dilution), Effective micro organism (1:1000 and 2.5: 1000 dilution). Seaweed extract (2.5 and 5%) along with control (distilled water) thus eleven treatments were laid out in Randomized Block Design with three replications. The experiment field was supplied with well rotten farmyard manure (20 t ha^{-1}) along with recommended dose of fertilizers NP (30: 50 kg ha^{-1}) + 5 t VC ha^{-1} + BF each 2.5 kg ha^{-1} to the plots and the growth regulators were sprayed at 30, 60 and 75 days after planting. The observations were recorded on five randomly selected plants from each plot on different growth and yield characters (Table 1 and 2). The data was analyzed by adopting the standard procedure of Panse and Sukhatme (1985) and using AGRISTAT software. Wherever the results were found significant, critical differences (CD) were computed at 5 percent level of probability to draw statistical conclusions.

Table.1 Effect of different organic growth regulators on growth parameters of dolichous bean

Treatments	Plant height (cm)	Chlorophyll content fresh leaf tissue (mg g)$^{-1}$	Leaf area (cm^2)	LAI	Days to flowering (DAS)
T_1 - RDF (control)	54.51	2.01	17.78	5.32	36.67
T_2 - INM (Without foliar application)	54.06	2.11	18.06	5.69	34.74
T_3 - INM + DAP @ 2%	63.06	2.12	18.34	6.00	33.76
T_4 - INM + Panchagavya @ 3%	69.96	2.16	18.62	6.32	32.78
T_5 - INM + Panchagavya @ 4%	75.92	2.14	18.89	6.64	31.84
T_6 - INM + Vermiwash @ 1:5 dilution	83.57	2.19	19.44	7.30	29.73
T_7 - INM + Vermiwash @ 1:7.5 dilution	90.23	2.62	19.72	7.66	28.81
T_8 - INM + Effective Micro organism @ 1:1000 dilution	79.74	2.16	19.16	6.97	29.79
T_9 - INM + Effective Micro organism @ 2.5:1000 dilution	86.43	2.2	19.45	7.32	28.87
T_{10} - INM + Seaweed extract @ 2.5% foliar spray	92.35	2.63	19.73	7.67	27.93
T_{11} - INM + Seaweed extract @ 5% foliar spray	96.13	2.75	20.00	8.02	27.01
SED	**1.49**	**0.05**	**0.11**	**0.14**	**0.36**
CD	**3.10**	**0.10**	**0.22**	**0.29**	**0.75**

INM: NP (30: 50 kg ha^{-1}) + VC @ 5 t ha^{-1} + BF 2.5 kg ha^{-1}

Growth parameters

The result revealed that the growth attributes were significantly influenced (Table I) as a result of foliar application of growth substances. Significantly higher plant height (96.13cm) and total chlorophyll in fresh leaf tissue (2.75 mg g^{-1}) were observed treatment T_{11} (INM + Seaweed extract @ 5%) was applied to crop.

Seaweed is involved in both cell division and cell elongation and can stimulate plant tissue resulting in enhanced vegetative growth (Rathore *et al.,* 2009).

The maximum leaf area (20.00 cm^2) and LAI (8.02) were registered by the same treatment (T_{11}). However, both were closely followed by the treatments T_7 (INM + Vermiwash @ 1:7.5 dilution) and T_{10} (INM + Seaweed extract @ 2.5%).

Higher chlorophyll in leaves might have increased the photosynthesis rate and activated the leaf growth and subsequently the leaf area and LAI of the plant.

The early flowering (27.01 days) in the treatment T_{11} (INM + Vermiwash @ 1:7.5 dilution) treated plants might be due to early completion of vegetative growth and better nourishment of plants.

Kocira *et al.,* 2013) also reported increased vegetative growth, higher biomass production and early flowering of *Phaseolus vulgaris L.* with seaweed treatment.

It may be concluded that for highest growth characters of Dolichos bean application of INM + Seaweed extract @ 5% foliar spray at 30, 60 and 75 days of planting may be practiced for the coastal region of Tamil Nadu.

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