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Effect of plant growth regulators and micronutrients on growth and yield of Ridge gourd (*Luffa acutangula* .L) cv.PKM-1

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ABSTRACT

The field experiment was carried on "Effect of plant growth regulators and micronutrients on growth and yield of ridge gourd (Luffa acutangula.L.)"cv. PKM-1was carried out at the Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalainagar, Tamil Nadu during 2017-2018. Application of Ethrel. Triacontanol, 24 epi brassino steroid as foliar spray in 10 treatment combination in RBD with three replications. The biometric observations on growth attributes viz., plant height, number of branches plant^{-1}, number of leaves plant^{-1}, number of flowers plant^{-1}, number male flowers vine^{-1}, number female flowers vine^{-1} number of fruits plant^{-1}, fruit set percentage, yield attributes viz., fruit weight, yield per hectare. All the treatments significantly influenced the biometric characters of ridge gourd and the results revealed that the treatment combination of 24 epi brassino steroid 2 ppm + ethrel 250 ppm + micronutrient 2% as foliar spray was found to be the best with ridge gourd fruit yield of 20.94 t ha^{-1} . From the experiment, it was concluded that the plant growth regulators and micronutrients viz., 24 epi brassino steroid 2 ppm + ethrel 250 ppm + micronutrient 2% were identified as the best to increase yield for ridge gourd.

***Key words**: Growth regulators, 24-epi brassino steroid, triacontanol, micronutrients*

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INTRODUCTION

Ridge gourd (*Luffa acutangula* .L) belonging to the family cucurbitaceae is native of India and it is presently grown throughout the tropical region. The tender fruits before fibre formation are used in culinary preparations and making various dishes. The fruits are rich in vitamins B, Vitamin C and minerals such as phosporus, Potassium, calcium and iron. In India, Ridge gourd is cultivated exclusively in states of Tamil Nadu, Andra Pradesh, Uttar Pradesh, Maharashtra, Kerala and Karnataka. It is one of the quickest maturing vegetable crop. It is a monoecious crop i.e male and female flowers are born separately on the same plant. In most of the cucurbitaceous crops, the yield mainly depends on the number of female flowers produced. The principle is sex modification in cucurbits lies in altering the sequence of flowering and sex ratio that normally ranges between 25:1 and 15:1. Growth regulators play an important role in both morphology and physiology of the plants. The effect of growth regulators varies with plant species and their growth stages. Concentration of chemicals application method and frequency of application of growth regulators have tremendous effect on sex expression and flowering in various contributes leading to either suppression of male flowers or increase in number of female flowers in ridge gourd.

MATERIALS AND METHODS

The field experiment was carried out to study the effect of growth regulators on growth and yield of ridge gourd at vegetable unit, Department of Horticulture, Faculty of Agriculture, Annamalai University, TamilNadu. The experiment were laid out with 10 treatments in a randomized block design (RBD) with three replications. The treatments included the foliar study of Ethrel 250 ppm, Triacontanol 2 and 4 ppm and 2 4 epi brassino steroid 2 and 4 ppm first spray was applied at 15 days after sowing of seeds and second, third and fourth spray was applied at seven days after the first spray in different combinations with a control as given in table-1

Biometrical observations viz., vine length, number of branches per vine, leaf area, number of leaves per plant, and yield characters viz., Days to first female flowering, number of male flowers per plant , number of female flower per plant , sex ratio per plant , number of fruits per vine, fruits set percentage and yield per ha^{-1} were taken from randomly selected five plants at harvest and the data are subjected to statistical analysis as suggested by Panse and Sukhatme [7].

RESULTS AND DISCUSSION

The present study was taken up to have a significant base pertaining to effects of Plant growth regulators on growth and yield of Ridge gourd. There was significant influence of plant growth regulators on growth parameters of Ridge gourd Table-2 The combined effect of 2 4 epibrassino steroid 2 ppm + ethrel 250 ppm showed maximum vine length of 320.34 cm were recorded with application of Triacontanol 2 ppm + ethrel 250 ppm + micronutrient 2% followed by Triacontanol 4 ppm + ethrel 250 ppm + micronutrient 2%. Foliar spray.

The maximum mean number of branches per vine 14.28 were recorded with application of 2 4 epibrassino steroid 2 ppm + ethrel 250 ppm + micronutrient 2% showed more number of branches. The increased number of branches may be due to cell division and enhancing activity of micro nutrients on apical meristem is responsible for activation of enzymes involved in the synthesis of IAA [1] found more number of branches. The maximum number of leaves per plant was observed in 24 epibrassino steroid 2 ppm + ethrel 250 ppm + micro nutrient 2% were recorded the value of 76.54. The increased in leaf number might be due to continuous availability of micronutrients and their involvement in nitrogen metabolism, protein synthesis and hormonal translocation. Hence, micro nutrients might have complimented higher leaf production. The finding in the present study were also supported by Meena *et.al*., [6] and Balraj *et al*. [2] in watermelon.

Table.1 Effect of growth regulators and micronutrients on Ridge gourd (*Luffa acutangula* L.) cv. PKM-1

	Treatments	Vine Length (cm)	No of Branches	No of Leaves	leaf area (cm^2)	Days to first flowering	No of male flowers per vein	No of female flowers per vein
T_1	Absolute control (water spray)	138.15	3.82	21.18	174.59	36.13	117.92	10.66
T_2	Ethrel 250 ppm	219.64	6.25	49.76	193.28	34.31	120.21	11.13
T_3	Ethrel 200 ppm + micronutrient 2%	236.32	9.64	55.24	227.64	32.54	122.69	11.55
T_4	Ethrel 250 ppm + micronutrient 2%	278.51	12.28	65.08	264.06	28.23	129.49	12.58
T_5	Tricantonal 2 ppm + ethrel 250 ppm	281.04	12.31	68.16	277.49	27.09	131.92	12.85
T_6	Tricantonal 2 ppm + ethrel 250 ppm + micronutrient 2%	294.69	13.04	71.04	289.80	26.13	134.16	13.26
T_7	Tricantonal 4 ppm + ethrel 250 ppm + micronutrient 2%	263.88	11.64	61.43	251.33	29.17	127.37	12.25
T_8	24-epiBrassinosteroid 2 ppm + ethrel 250 ppm	307.52	13.69	73.28	304.11	25.02	136.51	13.48
T_9	24-epiBrassinosteroid 2 ppm + ethrel 250 ppm + micronutrient 2%	320.34	14.28	76.54	317.42	23.53	138.64	13.82
T_{10}	24-epiBrassinosteroid 4 ppm + ethrel 250 ppm + micronutrient 2%	250.25	10.49	58.22	239.02	31.25	125.01	11.80
SE.d.		0.81	0.28	1.09	4.65	0.39	1.13	0.16
CD (P= 0.05)		11.63	0.56	2.18	9.31	0.78	2.32	0.34

Table .2 Effect of growth regulators and micronutrients on Ridge gourd (*Luffa acutangula* L.) cv. PKM-1

	Treatments	Sex Ratio	Fruit set percent (%)	No. of fruits/ vein	Fruit weight (g)	Yield plant^{-1} (g)	Yield /ha (t/ha)
T_1	Absolute control (water spray)	6.96	30.14	4.06	76.28	410	3.32
T_2	Ethrel 250 ppm	7.26	46.22	5.25	128.53	0.674	5.60
T_3	Ethrel 200 ppm + micronutrient 2%	7.46	51.13	5.94	142.74	0.848	7.04
T_4	Ethrel 250 ppm + micronutrient 2%	8.96	64.49	8.42	176.52	1.49	12.38
T_5	Tricantonal 2 ppm + ethrel 250 ppm	9.26	67.81	9.15	188.37	1.72	14.29
T_6	Tricantonal 2 ppm + ethrel 250 ppm + micronutrient 2%	9.46	70.68	9.86	200.09	1.97	16.37
T_7	Tricantonal 4 ppm + ethrel 250 ppm + micronutrient 2%	8.46	61.42	7.53	163.72	1.23	10.22
T_8	24-epiBrassinosteroid 2 ppm + ethrel 250 ppm	10.06	73.58	10.56	210.84	2.22	18.44
T_9	24-epiBrassinosteroid 2 ppm + ethrel 250 ppm + micronutrient 2%	10.36	76.43	11.27	223.56	2.52	20.94
T_{10}	24-epiBrassinosteroid 4 ppm + ethrel 250 ppm + micronutrient 2%	7.76	55.49	6.74	153.00	1.03	8.56
SE.d.		0.17	1.38	0.32	4.86	0.14	0.42
CD (P= 0.05)		0.35	2.76	0.64	9.72	0.28	0.84

The data on reproductive characters as influenced by various treatment combination. Application of growth regulators produced more number of female flowers, maximum fruit set percentage and sex ratio. In the present study, the highest number of female flowers per vine was recorded in the treatment of 2 4 epi brassino steroid 2 ppm + ethrel 250 ppm + micronutrient 2% foliar spray recorded the mean value of 11.50. The lowest number of female flowers recorded the mean value of 4.29 per plant in the treatment T_1 control. Among the different treatment combinations the fruit set percentage were recorded in the treatment T_9 2 4 epi brassino steroid 2 ppm + Ethrel 250 ppm + micronutrient 2% foliar spray. The hypothesis that sex differentiation controlled by the endogenous levels of steroidal hormones that result in narrow sex ratio and it can be attribute to the promotor effect of 2 4 epibrassino steroid and ethrel on pistillate flower initiation resulting in narrow sex ratio. The response of growth hormones and micronutrients foliar spray found to have significant effect of number of fruits per plant, yield per vine and estimated yield per hectare Bhatt *et al*., [3]. The treatment combination of 2 4 epibrassino steroid 2 ppm + ethrel 250 ppm + micronutrient 2% (T_9) foliar spray recorded the highest mean value of 11.27 fruits per vine. The minimum number of (4.06) fruits per vine was recorded in the treatment T_1 control. Similar results were observed by the Ikekawa, and Zaho. [4] in Tomato.

The treatment combination 2 4 epibrassino steroid 2 ppm and ethrel 250 ppm recorded the highest number of fruit yield per vine and estimated yield per hectare with a mean of 2.52 kg per vine and estimated yield 20.94 tonnes per hectare. The lowest yield of ridge gourd was recorded the mean value of 0.410 g and estimated fruit yield of 3.32 tonnes per hectare in the treatment (T_1) control. Similar, results were observed by Mahida *et al*. [5]. They suggested that the sole function of fertilized ovules or seeds in relation to growth of fruits was to synthesize one or more hormones, which initiate and maintain metabolic gradient along with foods can be transported from other parts of the plants to the fruit. Accelerated transport, coupled with efficiency of utilizing photo synthetic products might have resulted in increased yield in this treatment.

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