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GROWTH ACCELERATION IN CITRUSLATIPES ROOTSTOCK SEEDLINGS BY FOLIAR APPLICATION OF GIBBERELIC ACID AND UREA

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INTRODUCTION

Many times growth of stock seedling transplanting is poor because of many reason and one has to discard such seedling for budding quantity of which may be to the extent of 20-30 % (Srivastava and Nanaiah, 1972). This may cause an economical loss to the grower. The thickness of girth of rootstocks is one of the citeria to judge the seedlings for budding. Thinner wood has significantly larger in thicker wood (Ghosh and Chattopadhyay, 1972). Thinner wood also having contrsting situation may hamper translocation of nutrients. Kulwal (1991) reported that success of budding is related to shoot growth. Gibberellines are known to enhance growth of plants. Their main effect is that they are responsible for tallness. The stem of a plant contains more biological active gibberellins than does the stem of dwarf plant (Linocolntaiz and Zieger, 1991). Many workers had reported that plant growth was enhanced by gibberellins in citrus (Prasad and Singh,1980, Alluwar et.al., 1997, Dalal, et.al.,1999). No efforts have been made to enhance the growth of Citrus latipes by use of plant growth regulators and nutrients. Therefore, an attempts was made to see the effect of GA_3 and urea on growth of Citrus latipes

MATERIALS AND METHODS

The experiment was conducted at ICAR Research Complex for NEH Region, Umiam, Meghalaya during 2000-2001 on seedlings of Ctrus latipes rootstocks for growth acceleration. The treatments were five times in randomeised block design keeping 40 plants in each replication. The GA_3 was applied at the rate of 0 ppm, 10 ppm, 30 ppm, 50 ppm and 100 pmm whereas, urea was sprayed at the rate of 0 % and 1 % concentration. Foliar application was done 30 days after transplanting in second nursery. All treatments were given same cultural and plant measures. The data were recorded on shoot growth after 4-month growth. The leaf area was measured from 5 leaf taken from lower portion of the plant in each replication.

RESULTS AND DISCUSSION

GA_3 and urea had significant effect on stem girth. Among various treatment, GA_3 30 ppm + 1 % urea increase, GA_3 50 ppm + 1 %urea, GA_3 10 ppm+1 % urea, GA_3 30 ppm (Table 1). The effect of GA_3 may be due to increase in the size of the maristimatic region and further increase in production of cells, which are going cell division under (Loy, 1977) along with proportion of DNA synthesis in cell in growth phase of cell cycle (Jacqmard, 1968). Plant height was also significantly influenced by foliar application of GA_3 and urea. The application of GA_3 50 ppm had highest plant height (40.60 cm) which did not have significant edge over application of GA_3 30 ppm + 1 % urea (37.00) and GA_3 100 ppm (36.40 cm). it may be due to gibberellins increase both cell division and cell elongation, because increase in cell number and cell length have been noted (Lincolntaiz and Zeiger, 1991) Dalal et al. (1999) also found same in studies on growth acceleration in Rangpur lime rootstocks seedlings by foliar application of gibberellic acid and urea.

It is evident from the data that leaves per plant, leaf area and inter node length were significantly affected by gibberellins acid and urea. Mazimum leaves per unit (51.20 leaves) was counted when GA_3 50 ppm + 1% urea was applied. Whereas larger size leaf (21.50) cm2 and highest length of inter node (1.76 cm) was recorded in application of GA_3 30 ppm + 1% urea. Ross et.al. (1990) reported that inter node length is reduced and leaf growth altered by a reduction in GA_3 levels.

Data pertaining to fresh weight and dry weight of shoot indicate significantly influence of GA_3 and urea. The highest fresh weight of shoot (20.04) and dry weight (7.23 g) were recorded in foliar application of GA_3 50 ppm + 1% urea, which was at par with application of GA_3 50 ppm.

Root growth was also affected significantly by foliar application of GA_3 and urea (Table 2). The highest length of taproot was found in application of GA_3 30 ppm + 1 % ppm urea (22.80 cm), which was statistically on par with GA_3 10 ppm + 1% urea (21 .60 cm), GA_3 10 ppm (21.00 cm) and GA_3 50 ppm + 1 % urea (20.60 cm). However, root spread was found to be highest when GA_3 applied at 100 ppm along with 1% urea (15.00 cm) and lowest in control (10.60). Number of secondary roots, fresh and dry weight of roots also varied significantly. Amongst different treatments application of GA_3 30 ppm + 1% urea. Data pertaining to fresh and dry weight of roots indicated that maximum fresh weight of rots (11.42 g) and dry weight (3.86 g) were recorded in application of GA_3 50 ppm + 1% urea.

On the basis of above findings, it is concluded that foliar application ofmgibberellic acid 50 ppm or 30 ppm + 1 % urea may be effective to enhance over all growth of seedling of Citrus latipes rootstock to make them ideal for budding.

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Table 1. Effect of urea and GA_3 on shoot growth of Citrus latipes.

Treatments	Stem girth (mm)	Plant height (cm)	Leaves/ plant (cm)	Leaf area of shoot	length of inte node of shoot	Fresh weight (g)	Dry weight (g)
Control	4.40	21.20	25.80	14.40	1.14	8.32	3.37
GA_3 0 ppm + 1% urea	4.64	31.40	33.60	13.60	1.38	10.76	4.39
GA_3 10 ppm + 0% urea	6.26	28.00	35.80	19.50	1.48	11.36	4.07
GA_3 10 ppm + 1% urea	6.46	26.20	36.20	21.04	1.64	11.94	4.50
GA_3 30 ppm + 0% urea	6.20	26.40	35.40	17.00	1.58	10.44	4.21
GA_3 30 ppm + 1% urea	7.04	37.00	42.20	21.50	1.76	17.38	6.45
GA_3 50 ppm + 0% urea	6.94	40.60	42.40	18.70	1.32	19.28	6.66
GA_3 50 ppm + 1% urea	6.66	35.40	51.20	12.40	1.16	20.04	7.23
GA_3 100 ppm + 0% urea	6.06	36.40	39.20	11.20	1.54	14.60	5.10
GA_3 100 ppm + 1% urea	5.80	31.80	48.40	12.26	1.26	15.06	5.44
CD at 5%	1/04	5.67	3.94	2.07	0.14	0.81	0.23

Table 2. Effect of urea and GA3 on root length, spread, fresh and dry weight of roots of Citrus latipes.

Treatments	Length of root (cm)	Root spread (cm)	No. of secondary roots	Fresh weight of roots (g)	Dry weight of roots (g)
Control	14.60	10.60	45.60	7.82	2.44
GA_3 0 ppm + 1% urea	15.40	12.40	48.80	8.32	2.47
GA_3 10 ppm + 0% urea	21.00	11.80	38.40	7.82	2.34
GA_3 10 ppm + 1% urea	21.60	11.80	37.60	8.80	2.11
GA_3 30 ppm + 0% urea	17.60	12.80	32.40	7.68	2.31
GA_3 30 ppm + 1% urea	22.80	13.00	49.20	11.12	2.71
GA_3 50 ppm + 0% urea	12.00	11.40	41.20	10.26	2.98
GA_3 50 ppm + 1% urea	20.60	12.60	52.20	11.42	3.86
GA_3 100 ppm + 0% urea	18.20.	11.80	45.80	10.24	3.62
GA_3 100 ppm + 1% urea	20.40	15.00	54.20	10.24	3.62
CD at 5%	2.81	1.89	1.56	0.86	0.26