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INFLUENCE OF VARIOUS FORMS OF UREA AND GA_3 ON VASE LIFE OF CHRYSANTHEMUM (*Chrysanthemum morifolium* Ramat)

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Abstract: An experiment was carried out in the floriculture complex, Department of Horticulture, Annamalai University, Chidambaram, Tamil Nadu under naturally ventilated green house to study the influence of various forms of urea and GA_3 on vase life of chrysanthemum. The plants were subjected to four forms of urea (liquid feeding, tarcoated urea, neemcake coated urea and prilled urea) and four levels of GA_3 (water spray, GA_3 50 ppm, GA_3 75 ppm and GA_3 100 ppm). Among the various treatment combinations, the plants supplied with neemcake coated urea and sprayed with 100 ppm of GA_3 on 60,90 and 120 DAP retained flowers for a longer period (14.33 days) and showed maximum vase life (11.3 days).

Key words: Chrysanthemum, Neemcake coated urea, GA_3, Vase life.

INTRODUCTION

Chrysanthemum (*Chrysanthemum morifolium* Ramat) is one of the most important flower crops grown throughout our country. In the recent year's chrysanthemum is being grown on a commercial scale under greenhouse to meet the quality standards of international market and to ascertain continuous supply of flower throughout the year, as it is difficult to obtain good quality blooms under open conditions. The success of chrysanthemum cultivation under protected structures depends on various factors of which nutrients occupy a prominent position. Chrysanthemums are heavy feeder and have large requirements for both nitrogen and potassium. The emphasis at the early stage should be on nitrogen. In India, the traditional growers apply nitrogen through urea in the form of granules. Being a highly water soluble fertilizer, its availability depends on many factors. Losses due to leaching, denitrification and volatilization have been reported in various crops (Muneshwar Singh and Singh, 1986; Rayar 1990). There are many ways by which these losses could be minimized and the efficiency improved. Coating of urea is one such technology which has been tried in

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many field crops in order to improve use efficiency and maximize production (Som *et al.,* 1992; Sankaran and Subbiah, 1997). Then, to improve the production and quality, the plants were also treated with various concentrations of gibberellic acid (Roberts, 1959; Gorini, 1965; Ram *et al.,* 1970; El-shafie and Hassan, 1978; Jana and Biswas, 1979). Hence, the present investigation was carried out with a view to find out the influence of various form of urea and concentration of GA_3 on vase life of Chrysanthemum (*Chrysanthemum morifolium* Ramat).

MATERIALS AND METHODS

The investigation on influence of various forms of urea and GA_3 on vase life of chrysanthemum (*Chrysanthemum morifolium* Ramat) grown under naturally ventilated green house was carried out in the floriculture complex, Department of Horticulture, Annamalai University, Chidambaram, Tamil Nadu. The experimental site is located at about 6 km west of Bay of Bengal at $11^0$24' north latitude and $79^0$41'east longitude at an altitude of +5.79 M above the mean sea level (MSL).The mean maximum temperature ranges from 29.7^0C to 38.3^0C with a mean of 32.4^0 C while, the mean minimum temperature ranges from 21.1^0C to 27^0C with a mean of 24.1^0C. The mean relative humidity is 73 per cent. The experiment was conducted with various forms of urea *viz.,* liquid feeding (N_1), tar coated urea (N_2), neemcake coated urea (N_3) and prilled urea (N_4). Liquid feeding was given @ 200 ppm twice a week. Whereas tar coated urea, neemcake coated urea and prilled urea each at the rate of 8 g was given at the time of planting, 30 days after planting and 60 days after planting. Four levels of GA_3 *viz.*, water spray (G_1), 50 ppm of GA_3 (G_2), 75 ppm of GA_3 (G_3) and 100 ppm GA_3(G_4). Gibberellic acid was applied on 60^{th}, 90^{th} and 120^{th} day after planting. The trial was conducted in a factorial completely randomized design with three replications.

RESULTS AND DISCUSSION

Period of flower retention on plant (Days)

The data pertaining to the influence of various forms of urea, GA_3 and their interaction on flower retention are given in Table 1. The neemcake coated urea (N_3) showed the maximum flower retention period (13.08) followed by tarcoated urea (N_2) (12.33). On the other hand, the minimum period of flower retention was noticed in the prilled urea (N_4) (9.25). The superiority of this neemcake coated urea was attributed mainly due to slow release property, minimum loss and prolonged availability throughout the growth period. This is in conformity with the findings of Prasad *et al.,* 2001.

Among the GA_3 treatments, the maximum period of flower retention (12.17) was noticed in 100 ppm of GA_3 (G_4) which was significantly superior to 75 ppm of GA_3 (G_3) (11.50). A close analysis of data revealed that 75 ppm of GA_3 (G_3) and 50 ppm of GA_3 (G_2) were on par with each other. Minimum period of flower retention (9.50) was noticed in water spray (G_1).These results were in accordance with the findings of Ripka and Szanto (1988); Keltawi *et al.* (1995) and Kim Yuhyoung *et al.* (2001).

Among the treatment combinations, neemcake coated urea and 100 ppm of GA_3 (N_3G_4) retained flowers for a longer period (14.33). It was followed by the same form of urea with 75 ppm of GA_3 (N_3G_3) (13.67). The minimum days of flower retention on plants was observed in both liquid feeding under water spray (N_1G_1) (7.67) and prilled urea under water spray (N_4G_1) (7.67).

Table 1: Influence of various forms of urea and GA_3 on period of flower retention (days)

Urea forms	**GA_3**				
	G_1	**G_2**	**G_3**	**G_4**	**U mean**
LF-(N_1)	7.67	9.33	10.33	11.00	9.58
TCU-(N_2)	11.00	13.00	12.33	13.00	12.33
NCCU-(N_3)	11.67	12.67	13.67	14.33	13.08
PU-(N_4)	7.67	9.33	9.67	10.33	9.25
G- Mean	9.50	11.08	11.50	12.17	11.06
Effects		**S.Ed.**		**C.D(p=0.05)**	
Urea forms		0.27		0.55	
GA_3		0.27		0.55	
Urea x GA_3		0.54		1.10	

Vase life (days)

The data relating to the influence of various forms of urea, GA_3 and their interaction on vase life are presented in table 2. All forms of urea significantly influenced the vase life. The neemcake coated urea (N_3) registered a longer vase life (10.3) and it was followed by tarcoated urea (N_2) (8.7). The lesser vase life (7.5) was recorded in prilled urea (N_4).The extended vase life under neemcake coated urea could be attributed to better physiological status of flowers which might have facilitated good uptake of water. This is in conformity with the findings of Praburam and Sathiyamoorthy, 1993 and Prince *et al.,*1990.

Significant influence of GA_3 was noticed at all levels. The maximum vase life (9.5) was observed in 100 ppm of GA_3 (G_4) followed by 75 ppm of GA_3 (G_3) (8.7). The minimum vase life (7.5) was recorded in water spray (G_1). Vase life tended to prolong progressively with increase in concentration of GA_3. The extended vase life under GA_3 treatments might have resulted from increased accumulation of reserve food materials, water and maintenance of turgor pressure. Similar effects of GA_3 on extension of vase life were also observed by Reddy (1978) on aster and Nagarjuna *et al.*(1988) on Chrysanthemum. Among the interaction effects, the maximum vase life (11.3) was observed in the neemcake coated urea under 100 ppm of GA_3 (N_3G_4) followed by the same form of urea under 75 ppm of GA_3 (N_3G_3) (10.3) whereas, the combination of liquid feeding and water spray (N_1G_1) resulted in the minimum vase life (6.3).

Table 2: influence of various forms of urea and GA_3 on period of flower retention (days)

Urea forms	**GA_3**				
	G_1	**G_2**	**G_3**	**G_4**	**U mean**
LF-(N_1)	6.3	7.3	7.6	9.0	7.61
TCU-(N_2)	7.7	8.7	9.0	9.3	8.7
NCCU-(N_3)	9.3	10.0	10.3	11.3	10.3
PU-(N_4)	6.7	7.3	7.7	8.3	7.5
G- Mean	7.5	8.3	8.7	9.5	8.5
Effects		**S.Ed.**		**C.D(p=0.05)**	
Urea forms		0.31		0.63	
GA_3		0.31		0.63	
Urea x GA_3		0.62		1.27	

CONCLUSION

On the basis of result and discussion it may be concluded that chrysanthemum plants supplied with neemcake urea and sprayed with 100 ppm GA_3 at 60,90 and 120 days after planting showed the maximum flower retention period and longer vase life. Since the vase life was studied with standard preservative solution, the extended vase life under neemcake coated urea could be attributed to better physiological status of flowers might have facilitated good uptake of water. Vase life tended to prolong progressively with increase in concentration of GA_3. The extended vase life under GA_3 treatments might have resulted from increased accumulation of reserve food materials, water and maintenance of turgor pressure.

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