

Effect Of Application Of Growth Retardant ALAR On Some Foliage Characters of Local Cultivar of Chrysanthemum

O. M. El-Sheibany, N.A.El-Malki, A. Barras-Ali

¹*Botany department, Faculty of Science, Garyounis University, Benghazi, Libya*

²*Al- Fateh Center for Gifted Students, Benghazi, Libya*

ABSTRACT

The use of chemical growth retardants to produce shorter plants of good quality has become commonplace in the florist industry. In this investigation, a local cultivar of *Chrysanthemum morifolium* was treated with growth retardant ALAR as a foliar spray at different rate. The results revealed that

- * Treated plants, compared to untreated, were significantly shorter in stem length, internodes length associating with increased in stem diameter.
- * The short foliage stature was proportional with the concentration of ALAR.
- *ALAR application had no effect on apical dominance, flower initiation and time of sprouting of auxiliary buds.

Key words: *ALAR ; Chrysanthemum; Stem diameter; Internodes length; Flower number.*

INTRODUCTION

Growth retardants are commonly used for obtaining plants of compact habit, mainly in ornamental plant production. ALAR considers one of the most systematic growth retardants, so it has various effects in plants (Basra, 1994). It belongs to the group of succinic acid, unlike other growth retardants, ALAR contains no benzene ring, quaternary ammonium or phosphonium cation, nor any substituents that are small, nucleophilic, and non ionizable, containing a C-C-C-N system (Weaves, 1972; Wareing & Philips, 1975).

Zalewska, (1989) reported that, ALAR applied at a concentration 0.125 % on pot cultivation chrysanthemum had the biggest dwarfing effect over many other growth retardants (Bercom, CCC and Bonzi). Read and Hoysler, (1971) also found that ALAR reduced plant stature by reducing internode's length as a result of compact cells. The foliage is also coloured deeper green associated with greater stem strength.

EXPERIMENTAL

Unrooted stem cutting of local cultivar of *Chrysanthemum morifolium* L Asteraceae family was used supplied from a local arboretum in Benghazi. Each two cutting were planted in 12 cm pots. The potting material was described in (El-Sheibany, El-Malki & Barras-Ali, 2005). Pots were filled with peat moss to the top with the upper 2 cm left for irrigation. Then transferred to

the green house and protected from excessive sun light, by covering them with transpiring curtain (De Ruiter and Tromp, 1996).

The active gradients (percent weight) of the retardant ALAR were succinic acid 2-2-Dimethylhydrazide 85.0 % and inert ingredients 15.0 %. Four concentration of the retardant ALAR was prepared, 0, 1250, 2500 and 5000 ppm. ALAR was applied as a foliar spray to the plant top up to the run off point. ALAR treatment was carried out one week after planting and then repeated two weeks after the first application. The applications usually took place in the afternoon on well-watered plants to maximize absorption of ALAR. All measurements have been carried out after two weeks from the second application of ALAR, the parameters measured were.

Plant height, measured from the top of the pot to the height, of the upper most leaf. Number of nodes and the length of the internodes calculated with ruler in centimeters. Stem thickness measured by using a caliper just above the leaf to be cut and measure later. During the experiment, the temperature and the humidity were under control.

The experimental design was completely randomized design. Analysis of variance was carried out; mean separation test was done by using Duncan multiple range tests at 5%. Correlation between parameters was performed (Fowler et, at 1998).

RESULTS AND DISCUSSION

Application of retardant ALAR at all concentrations, compared to control resulted a significant reduction of shoot length of Chrysanthemum plants which was inversely of proportional to ALAR concentration ($r = 0.49$). In addition to ALAR effect, it has been found that the reduction in the stem length increased as the time of growing increased from 2 week to 8 weeks Figs. 1 & 2.

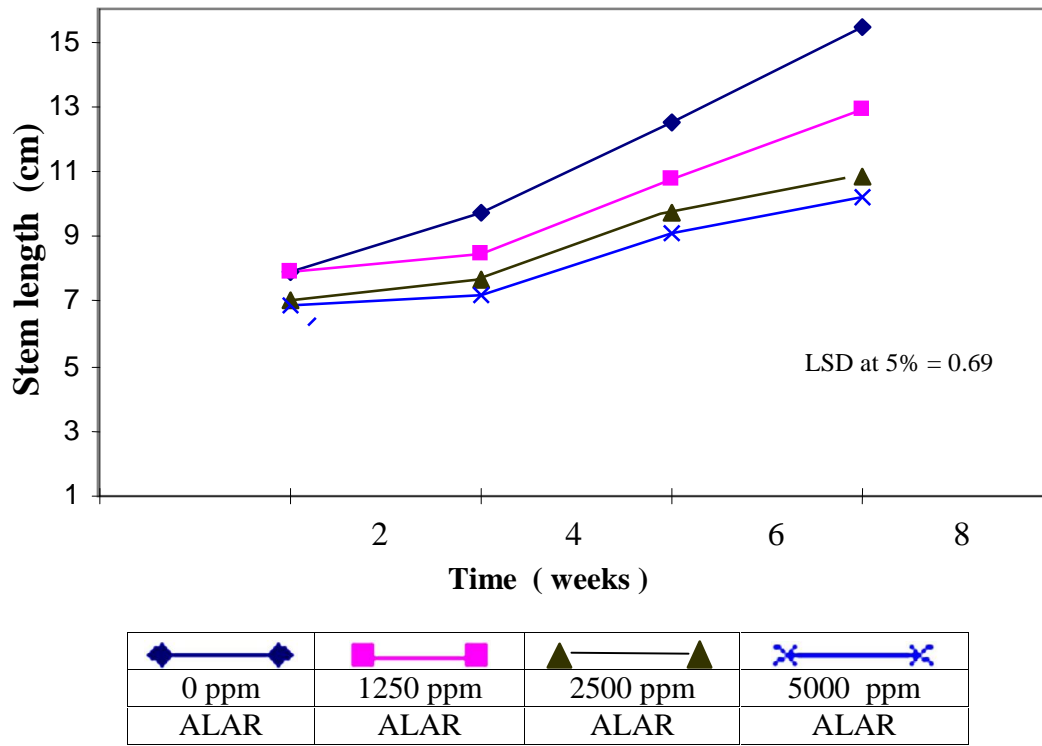


Fig.1. The change in stem length after applying retardant ALAR



Fig. 2. Effect of growth retardant ALAR on plant growth four week after application.

other hand, Data taken at 6th and 8th weeks intervals showed that, stem thickness responded differently, as it has directly proportional to retardant concentration ($r = 0.05$) (fig 3). Moreover, the data obtained showed that internode's length was inversely proportional to ALAR concentration ($r = 0.71$), especially with increasing the time of growing (Fig, 4) However, Numbers of internodes have not been influenced by the retardant application. Axillary's buds sprouting accrued at the same time and in the same manner in treated and untreated plants. This was in agreement with many reports, since they indicated that the most of plant characteristic growth were alter by using growth retardants (Barras – Ali (2002) De Ruiter & Tromp (1996)). However, Barras – Ali (2002) explained that increased in stem diameter in *Chrysanthemum morifolium* was due to transverse cell expansion and division in the sub apical tissues

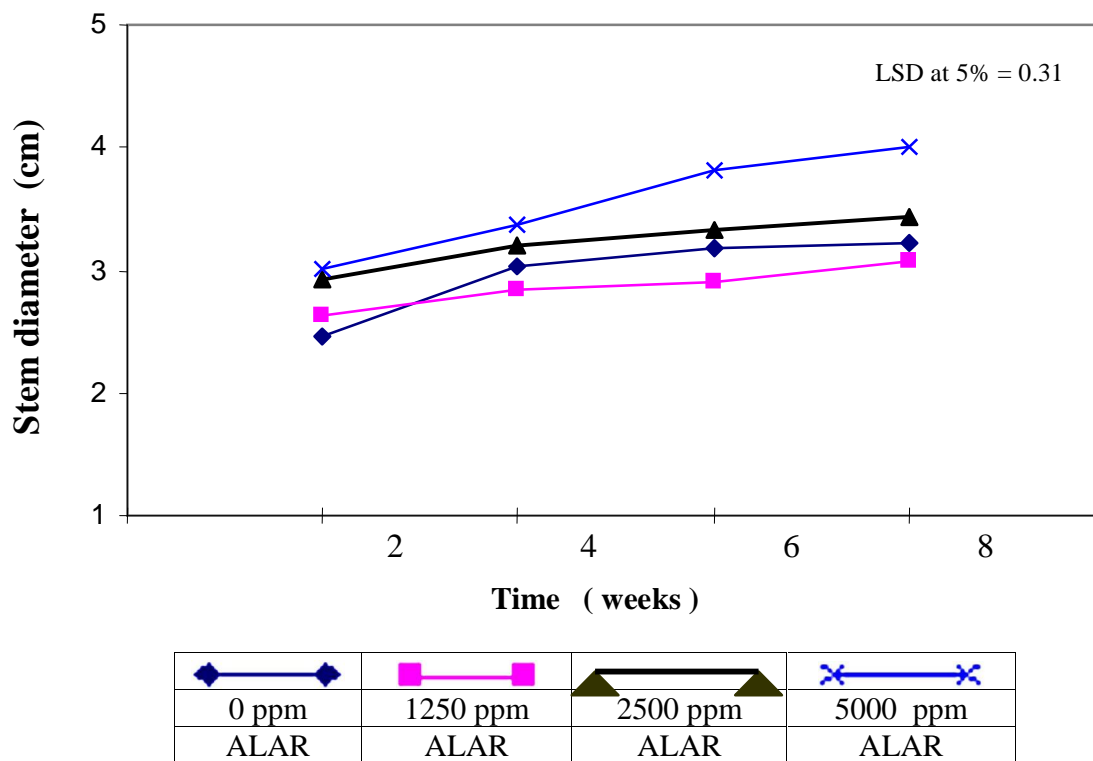


Fig. 3. The change in stem diameter (thickness) after applying retardant ALAR

were stimulated by the growth retardants, Amo-1618, phsfon D and cycocell. Other reported that cortex and pith constituted a large portion of the stem cross section of treated *Pharbitis* plants (El-Keltawi, Mousa & Makary,1996; Crittendon, 1966). Application of Amo – 1618 stimulate the cell production of the cambium, accompanied by a delay in cell differentiation, and to an increase in cell volume of the parenchymatous cortical cell in bean plants Crittendon (1966).

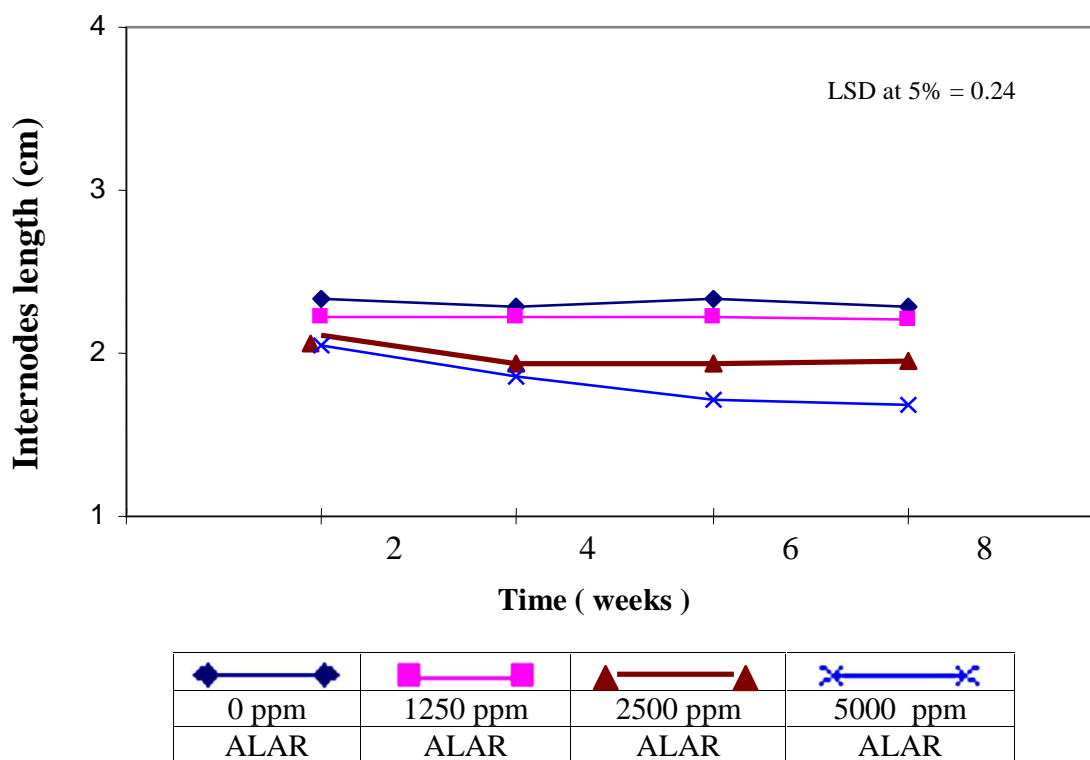


Fig. 4. The change in internode's length after applying retardant ALAR

CONCLUSION

Growth retardant ALAR at all concentrations applied, produced plants with shorter foliage; thicker stem and internode's growth were shorter while numbers of internodes have not been influenced by the retardant. These results considers desirable for characters need for ornamental plants for shopping and decoration.

REFERENCES

- Barras-Ali, A. (2002). *Effect oh Growth Retardant ALAR on growth and flowering of chrysanthemum*. M. Sc. Thesis. Benghazi: Garyounis University.
- Basra, A. S. (1994). *Mechanisms of Plant growth and improved productivity (modern approaches)*. New York: Marcel Dekker.
- Crittendon, C. E. (1966). *Effect of B- NINE and cycocel on anatomical structure of some commercial plants*. Ph.D Thesis. Kansas: Kansas University

- De Ruiter, H. A, & Tromp, J. (1996). The growth and quality of axillary's shoots of chrysanthemum as affected by number and position. *Journal of Horticultural Science*, 71, 607-612.
- El- Keltawi, N. E., Mousa, G. T. & Makary, B. S. (1996). Regulation of chrysanthemum growth using GA3 and ALAR to over come salinity depressions. *Acta Horticulture*, 426, 657- 665.
- El- Sheibany, O. M., El- Maki, N., & Barras- Ali, A. (2005). Effect of application of growth retardant ALAR on some foliage characters of local cultivar of chrysanthemum morifolium. *Journal of Science and its application*, (in press).
- Fowler, J., Cohen, L & Jarvis, P. (1998). *Practical statistical for field biology*. New York: John Willy & Sons, Inc.
- Read, P.E., & Hoysler V. (1971). Improving rooting of carnation and poinsettia cutting with succinic acid -2, 2- Dimethylhydrazide. *Hortiscince*, 6, 350
- Wareing, P. F & Philips, I. D. J. (1975). *The control of growth and differentiation in plants*. Oxford: Pergamon Press Oxford. Ltd.
- Weaver, R.J. (1972). *Plant growth substances in agriculture*. W. H Freeman and Company.
- Zalewska, M. (1989). Growth regulators in pot culture of chrysanthemum cultivars 'palom', and 'Promyk'. *Acta Horticulture*, 251, 335-340.