

EFFECT OF BRASSINS (β -GLUCOSYL LINOLENATE) AND OTHER GROWTH REGULATORS
ON LILIUM LONGIFLORUM, THUNB. 'NELLIE WHITE'

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ABSTRACT

Brassins (β -glucosyl linolenate), ancymidol (α -cyclopropyl- α -(4-methoxyphenyl)-5-pyrimidine methanal) (A-Rest), CBBP (tributyl-2,4-(dichlorobenzyl) phosphonium chloride) (Phosfon), and ethephon (2-(chloroethyl) phosphonic acid) (Ethrel) spray or drench treatments were applied to 'Nellie White' Easter lilies. Brassins treatment did not significantly affect height but did increase flower number. Highest ethephon concentrations resulted in bud abortion. Highest concentrations of ancymidol and ethephon treatments significantly reduced height with no significant difference in flower number.

INTRODUCTION

Frequently, tall Easter lilies are produced with low bud count and excessive height. This can be due to cultural practices (DeHertogh, 1971). Growth regulating chemicals have resulted in higher bud counts in Georgia lilies (Hasek, 1971). CBBP has been used effectively for Easter lily height reduction (Adelman, 1970; Hasek, 1971; Wilkins, 1963). Ancymidol has been reported to reduce Easter lily plant height (Furuta, 1972; Gill, 1974; Hasek, 1974; Hasek, 1971; Larson, 1971; Wilkins, 1963). Ethephon has been used to reduce height in a broad spectrum of plants (Sanderson, 1969) including Easter lilies (Lin, 1969).

MATERIALS AND METHODS

Precooled, 17.7 to 20.3 cm bulbs, cv. Nellie White, were potted in 15.2 cm plastic pots containing a 2:2:1 mixture of sand:peat:soil by volume on December 23, 1972 and placed in 15.6°C (60°F) night temperature with day temperature approximately 5°C higher. Second watering was with the fungicides Dexon 35% WP (1 ml/1.6 L) and Terraclor 75% WP (1 ml/3.2 L) at 237 ml per pot.¹ On January 20, 1973, the plants were 10.2 cm tall, when the population was divided into 15 replications of 12 treatments (Table 1) in a completely randomized design. All treatments except the CBBP treatments were applied at this time. The CBBP was applied at the 15.2 cm height, as recommended by the manufacturer.

¹Information obtained from 1973 Easter Lily Schedule by Jay S. Koths, University of Connecticut, Storrs.

At anthesis of the first flower in each pot the following data were obtained:

- (1) total plant height
- (2) height to pedicel base
- (3) number of days from planting to anthesis of 1st flower
- (4) number of salable buds

Height was determined by measuring from the top of the pot.

TABLE 1. Treatments Applied to 'Nellie White' Easter Lily

<u>Treatment</u>	<u>Type of Application</u>
(1) Control	No chemical treatment
(2) Ancymidol 0.25 mg in 237 ml/pot	soil drench
(3) Ancymidol 0.5 mg in 237 ml/pot	soil drench
(4) Ancymidol 1.0 mg in 237 ml/pot	soil drench
(5) Ancymidol 2.0 mg in 237 ml/pot	soil drench
(6) Ethephon 0.125 mg in 237 ml/pot	soil drench
(7) Ethephon 0.25 mg in 237 ml/pot	soil drench
(8) Ethephon 0.5 mg in 237 ml/pot	soil drench
(9) CBBP 5208 ppm	soil drench
(10) CBBP 10417 ppm	soil drench
(11) Brassins $1 \times 10^{-6}M$	foliar spray
(12) Brassins $5 \times 10^{-7}M$	foliar spray

RESULTS AND DISCUSSION

Ethephon at 0.5 mg resulted in excessive bud abortion and was not included in the analysis of variance.

Drenches of Ancymidol at 2.0 mg and ethephon at 0.25 mg resulted in plants which were significantly shorter than plants treated with other chemicals. (See Table 2.) Ethephon at 0.125 mg gave significantly shorter plants than any treatment except the two listed above. There was no difference between brassins at $5 \times 10^{-7}M$, ancymidol at 1.0 mg and at 0.5 mg, and the control; and there was no difference between brassins at $5 \times 10^{-7}M$ and at $1 \times 10^{-6}M$, CBBP at 5208 ppm, and at 10417 ppm, ancymidol at 0.25 mg and at 0.5 mg, and the control.

Height to pedicel base differences are shown in Table 2. Plants treated with ancymidol at 2.0 mg, ethephon at 0.25 mg, ethephon at 0.125 mg, and ancymidol at 1.0 mg were significantly different from each other, in ascending order, and significantly shorter than the other treatments. There was no significant difference between ancymidol at 0.5 mg, brassins at $5 \times 10^{-7}M$, CBBP at 5208 ppm and at 10417 ppm, and the control. There was no significant

TABLE 2. Differences between Chemical Treatments of 'Nellie White' Easter Lily

Treatment	Total Height (cm) ¹	Pedicle Base Height (cm) ¹	Number of Flowers ¹	Number of Days to Anthesis
Control	55.50 cd	42.24 ef	4.20 ab	60.87 a
Ancymidol 0.25 mg in 237 ml/pot	58.90 d	45.17 f	5.00 c	60.00 a
Ancymidol 0.5 mg in 237 ml/pot	53.73 cdcd	40.69 e	4.80 bc	60.47 a
Ancymidol 1.0 mg in 237 ml/pot	49.13 c	34.83 d	5.40 c	61.93 a
Ancymidol 2.0 mg in 237 ml/pot	33.20 a	19.50 a	4.73 bc	65.87 b
Ethephon 0.125 mg in 237 ml/pot	42.53 b	30.63 c	3.67 a	61.53 a
Ethephon 0.25 mg in 237 ml/pot	35.07 a	24.70 b	3.87 a	61.80 a
CBBP 5208 ppm	58.40 d	44.40 ef	4.67 bc	60.60 a
CBBP 10417 ppm	55.77 d	42.40 ef	5.07 c	61.27 a
Brassins 1 x 10 ⁻⁶ M	59.74 d	46.10 f	5.27 c	60.67 a
Brassins 5 x 10 ⁻⁷ M	53.67 cd	40.70 e	5.13 c	61.07 a

¹ Values followed by unlike letters are significantly different at the 0.05 level according to the Duncan's Multiple Range Test.

difference between brassins at $1 \times 10^{-6}M$, ancymidol at 0.25 mg, CBBP at 5208 ppm and at 10417 ppm, and the control.

Ancymidol at 2.0 mg significantly delayed flowering, by four days (Table 2).

Number of salable flowers are shown in Table 2. Ethephon treatments at 0.125 and 0.25 mg resulted in significantly fewer buds than any of the other chemical treatments. The treatments including the control, ancymidol at 2.0 mg and at 0.5 mg, and CBBP at 5208 ppm were not significantly different from each other. Ancymidol at 0.25 mg, at 0.5 mg, at 1.0 mg, and at 2.0 mg_2 , CBBP at 5208 ppm and at 10417 ppm, and brassins at $5 \times 10^{-7}M$ and at $1 \times 10^{-6}M$ were not significantly different from each other.

The data suggests that only three treatments, ancymidol at 2.0 mg and ethephon at 0.125 mg and at 0.25 mg, resulted in significant growth reduction as these were the only treatments that were significantly shorter than the control. The only significant ancymidol response was at four times higher than the recommended rate even though previous data has shown ancymidol at 2.0 mg to give excessive height reduction and that lower rates were optimal (Lindstrom, 1975). This may be attributed to differences in the forcing conditions.

Other treatments exerted either no effect or a growth promotion effect. Brassins treatments are of particular interest since there was no significant height increase over the control, even though brassins have been shown to promote height growth in monocots such as maize (Kang, 1973). The treatments of ancymidol at 0.25 mg and at 1.0 mg, CBBP at 5208 ppm, and brassins at $5 \times 10^{-7}M$ and at $1 \times 10^{-6}M$ all had significantly more salable flowers than the control. The increased number of salable flowers warrants further investigation.

Ethephon at 0.125 mg and at 0.25 mg would appear to be the most desirable treatments since they gave significantly shorter plants with no significant difference in salable flowers or days to flowering.

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