# Research Report: Oriental Lily Growth Regulator Study 

Brian E. Whipker and P. Allen Hammer<br>Horticulture Department<br>Purdue University

Oriental lilies have increased in popularity as a pot crop over the past few years. They offer a wide range of colors and can easily be scheduled for spring or Mothers Day sales. Most cultivars are aggressive growers, therefore applications of growth regulators are needed to produce an acceptable pot-sized plant. This study was conducted during the spring of 1992 to compare height control of different growth regulators, specifically geared towards stopping the dramatic stretch that occurs at emergence.

The $14 / 16$ size oriental lily bulbs of cultivars Star Gazer, Early Rose, and Premier, were grown in $61 / 2^{\prime \prime}$ standard pots starting on February 15 , with the bulbs being placed at least 2 " deep in the pot to promote brace root formation from the stem (Table 1). The root media contained 1 soil: 2 sphagnum peat : 2 perlite (by volume) mixture amended with $1 \# \mathrm{KNO}_{3}, 1 \# \mathrm{MgSO}_{4}$, 8 \# ground limestone and 2 ounces Peter Frit Industries trace elements No. 555, all per cubic yard of mix. The plants were maintained at a 60 F night temperature and 70F day temperature. A completely randomized design of five single-plant replicates was used. The plants were fertilized at each watering with 200 ppm each of N and K supplied from 4\#, 5 ounces $\mathrm{KNO}_{3}$ and $3 \#, 1$ ounce $\mathrm{NH}_{4} \mathrm{NO}_{3}$, all per 5 gallons of concentrated fertilizer, with $46 \mathrm{ppm} P$ supplied via technical grade phosphoric acid in the irrigation system. Plant growth regulator treatments were dividedinto three application methods (Table 2). Group 1 consisted on a 30 minute preplant dip of the bulbs. Group 2 bulbs were planted and immediately had 6 ounces of growth regulator application applied. Group 3 had 6 ounces of growth regulator applied when shoots of 4 out of
the 5 pots had emerged. This corresponded to February 28 for Premier, March 2 for Early Rose and March 4 for Star Gazer.

The number of days to emergence of the plant and days to flowering were recorded. At flowering, plant height from the pot rim to the top of the inflorescence and number of viable flowers per pot were also recorded. In addition, peduncle length (the stem tissue between the actual flower head and the main upright stem) was measured on Premier and Star Gazer. Plant response to the plant growth regulators used was determined by regression analysis.

## Comments

Forall threecultivars, the post-plantdrench application data is not included (treatments 5 through 9). Because of a labeling error with the pots, the chemical application was not correctly applied to two of the treatments and a double check mechanism was not in place to be assured of the accuracy of the remaining post-plant drench treatments. Therefore, all the post-plant drench application data was deleted from this summary. (Although the data was not included, none of the post-plantdrench treatments gave acceptable height control.)

## Early Rose

Early Rose was the earliest flowering cultivar in this study. Flowering occurred on average 64 days after planting and 48 days after emergence, but the emergence time, flowering date, and number of days from emergence until flowering all were not significant between treatments.
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Table 1. Oriental Lily Production Schedule, 1992.

| 2/15 | Bulbs arrive |
| :---: | :---: |
|  | Preplant Growth Regulator Treatment (Group 1) |
|  | Pot |
|  | Postplant Growth Regulator Treatment (Group 2) |
| 2/21 | Fungicide ( +1 wks ) (8 oz. Benlate +.5 oz Subdue) |
|  | Post-Emergence Drench (Group 3) |
|  | 2/28 Premier |
|  | 3/2 Early Rose |
|  | 3/4 Star Gazer |

3/20 Fungicide ( +5 wks ) ( 8 oz . Banrot)
4/17 Fungicide ( +9 wks ) ( 8 oz. Banrot)
5/15 Fungicide ( +13 wks ) ( 8 oz. Banrot)
Temperature: $\quad<70^{\circ} \mathrm{F}$ Days $/ 60^{\circ} \mathrm{F}$ Nights
Fertilizer: $\quad 200 \mathrm{ppm} \mathrm{N}$ and K every watering.
Water: Watered well at planting, then kept moist but not wet.

Table 2. Oriental Lily Plant Growth Regulator Treatments.

| Group | Treatment | Active Ingredients | Mixing Rate (oz/gallon) |
| :---: | :---: | :---: | :---: |
| Group 1: | DIP ( 30 minutes) <br> 1. Untreated Control |  |  |
|  |  |  |  |
|  | 2. A-Rest | $1 \mathrm{mg} / \mathrm{plant}$ | 2.73 |
|  | 3. Sumagic | . $125 \mathrm{mg} / \mathrm{plant}$ | 0.18 |
|  | 4. Sumagic | . $25 \mathrm{mg} / \mathrm{plant}$ | 0.36 |
| Group 2: | POST-PLANT DRENCH <br> 5. Untreated Control |  |  |
|  |  |  |  |
|  | 6. A-Rest | $1 \mathrm{mg} / \mathrm{plant}$ | 2.73 |
|  | 7. Sumagic | . $125 \mathrm{mg} / \mathrm{plant}$ | 0.18 |
|  | 8. Sumagic | $.25 \mathrm{mg} /$ plant | 0.36 |
| Group 3: | POST-EMERGE DRENCH |  |  |
|  | 9. A-Rest | $1 \mathrm{mg} / \mathrm{plant}$ | 2.73 |
|  | 10. Sumagic | . $125 \mathrm{mg} / \mathrm{plant}$ | 0.18 |
|  | 11. Sumagic | $.25 \mathrm{mg} /$ plant | 0.36 |

Figure 1. Early Rose Orlental Llly Helght Control by Treatment.


Thenumber of flowers per stem was alsonotsignificant.

Plant height varied significantly between treatments (Fig. 1). The bulb dip treatments did not control plant height significantly to produce a marketable plant within proportion to pot size. The post-emergence drench applications gave the greatest height control, although only the A-Rest application ( $1 \mathrm{mg} / \mathrm{pot}$ ) resulted in a plant within proportion to its pot size. With all treatments, the plants had a region of long internode stretch near the base of the plant.

The color of the flower was outstanding for Early Rose, which was a light pink. The open flowers tended to fade as they aged, although the pink colorintensified when the plants were stored in the cooler. The pollen was rust colored, which easily stained clothes. The leaf color was a lighter green, which detracted from its appeal as a potplant. In addition, the lower part of the plant tended to loose some of its leaves.

## Premier

Flowering occurred with Premier on average 78 days after planting and 65 days after emergence, but the time until emergence, flowering and growing days were not significant between treatments.

The growth regulators had a more pronounced affect on plant height with Premier than on Early Rose. Plant height was significantly different among treatments (Fig. 2). Post-emergencedrenches of A-Rest ( $1 \mathrm{mg} / \mathrm{pot}$ ) and Sumagic ( $.125 \mathrm{mg} / \mathrm{pot}$ and $.25 \mathrm{mg} / \mathrm{pot}$ ) gave the greatest height control, although the plants still had the characteristic internodal stretch on the lower $6 "$ of the plant. These three post-emergence treatments resulted in acceptable pot-plants for the market. Peduncle length was also significant between treatments (Fig. 3). The A-Rest ( 1 mg / pot) post-emergence drench gave the most compact flower head.

Premier had beautiful pure white flowers

Figure 2. Premier Oriental Llly Height Control by Treatment.


Treatment
with rust colored stamens. The pollen production was heavy and could easily stain clothing. The leaves were dark green and long and slender, which nicely accented the plant.

## Star Gazex

The number of days to flowering and days from emergence to flowering for Star Gazer were significantly different among treatments (Fig. 4). Applications of $.25 \mathrm{mg} /$ pot of Sumagic, both preplant dip and post-emergence drench, delayed flowering in Star Gazer by a few days. On average, flowering occurred 106 days after planting and 88 days after emergence.

Plant height was significantly different among the treatments (Fig. 5). Application of the post-emergence drenches resulted in the shortest plants and shortest peduncle length and produced plants that were all marketable as a pot crop. Sumagic at $.25 \mathrm{mg} /$ pot (Fig. 6) gave the greatest height and peduncle length reduction.

The flower was a deep pink with white margins and large in size. Pollen production was also heavy and it could easily stain clothing. The
flowers had an almost overpowering fragrance that could be too strong in locations with limited air movement.

Conclusions
The objective of reducing the initial internode stretch as the plant emerges was not achieved in this study with any of the treatments, although acceptable sized plants for pot sales were produced with some of the treatments. The greatest plant height reduction was with the post-emergence treatments of A-Rest ( $1 \mathrm{mg} /$ pot) andSumagic ( $.125 \mathrm{mg} / \mathrm{pot}$ and $.25 \mathrm{mg} /$ pot) for the cultivars Premier and Star Gazer. Only the post-emergence application of A-Rest provided acceptable results forEarly Rose, the cultivar with the shortest growing season.

Additional studies should be conducted with higher pre-plant dip concentrations and applications of chemicals just prior to shoot emergence to reduce the initial internode elongation.

Thanks is expressed to the Fred C. Gloeckner Inc. for providing the plant material.

Flgure 3. Premier Oriental Llly Peduncle Length by Treatment.


Treatment

Figure 4. Days from Emergence to Anthesis for Star Gazer Oriental Lily.


Treatment

Figure 5. Star Gazer Orlental Llly Helght Control by Treatment.


Figure 6. Star Gazer Oriental Lily Peduncle Length by Treatment.


Treatment

