

Research Progress Report on:

ETHYLENE TOLERANCE OF HYBRID LILIES

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Ethylene Tolerance of Hybrid Lilies

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Summary:

Four hybrid lily varieties, L.A. *Lilium* 'Princess Amalia', L.A. *L.* 'Red Alert', Asiatic *L.* 'Renoir', and Oriental *L.* 'Stargazer' were received as pre-cooled, frozen bulbs. After arrival, bulbs were planted on September 26, 2008, rooted in a cooler at 2 °C for three weeks, held at 6°C for 12 days until emergence, and held at 2°C for 12 days. Plants were then moved to a glass-covered greenhouse at 15°C night temperature, 20°C day temperature, and received natural light. As of December 31, visible bud was apparent on all cultivars.

Calcium deficiency symptoms occurred on 'Stargazer' lilies but symptoms were alleviated with 1.4 g/L calcium chloride sprays 1-2 times each week and a fertilizer change from 250 ppm 20-10-20 to 250 ppm 15-0-15. Lower than average winter light levels in North Carolina resulted in significant bud abortion in 'Princess Amalia'; our grower contact also noted an increase in bud abortion this winter. Thus far, the other three varieties have not had significant bud abortion.



Stargazer lily with developing buds. Leaf burn due to calcium deficiency was addressed with calcium chloride sprays and fertilizer change.

Changes to Methods as described in original proposal:

- Stems will be stored **in water at 4.0 °C**.
- Ethylene treatments will be at 0 or 10 $\mu\text{L L}^{-1}$ for **18 hours**.
- Stems will be left at **50 cm for vasselife observation**.

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- **Three stems** each of treatments **not pretreated to prevent ethylene damage** (Treatments 1-4, see list below) and **all stored treatments** (Treatments 3,4,7,8,11, and 12) will be used for carbohydrate analysis to answer the questions: “Does cold storage increase ethylene sensitivity by increasing starch hydrolysis (Treatments 1-4)?” and “Does 1-MCP or STS prevent ethylene damage after cold storage by altering carbohydrate conversions during cold storage (Treatments 3,4,7,8,11, and 12)?”

Treatments:

1. No anti-ethylene pre-treatment/non-stored/no ethylene
2. No anti-ethylene pre-treatment/non-stored/ethylene
3. No anti-ethylene pre-treatment/Stored/no ethylene
4. No anti-ethylene pre-treatment/Stored/ethylene
5. 1-MCP/Non-stored/No ethylene
6. 1-MCP/Non-stored/Ethylene
7. 1-MCP/Stored/No ethylene
8. 1-MCP/Stored/Ethylene
9. STS/Non-stored/No ethylene
10. STS/Non-stored/Ethylene
11. STS/Stored/No ethylene
12. STS/Stored/Ethylene