

USU Kickoff: New Research Highlights

Melanie Stock and The Small Farms Lab
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Utah State University

6th Annual Cut Flowers Session
USU Urban & Small Farms Conference
February 20, 2024 @ 9:00 am

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The Small Farms Lab

Students – research primarily at UAES Greenville Farm (North Logan, UT)

- Nick Volesky (M.S.)
- Cambry Adams (M.S.)
- Olive Stewart (B.S.)

• Grower-Technicians

- Amanda Pratt
- Ali Harrison
- Kellie Webb

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Research: optimize high-value crops and sustainability for regional conditions

- **Season extension** and protected cultivation to address supply shortages, lower quality, improving timing.
 - Delphinium and larkspur production in high tunnel and field systems (Nick Volesky).
- **Sustainable soil, nutrient, and water management;** drought considerations.
 - Deficit irrigation and rates recommendations for dahlia (Cambry Adams).
 - Restricted irrigation of water-wise annuals, in tunnel and field systems + wool mulch (Olive Stewart).

2023: all new trials began!

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Delphinium and larkspur with protected cultivation

Nick Volesky

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Delphinium and Larkspur Goals

- Determine optimal spring establishment timing to optimize production in a high tunnel and field (harvest timing, yield, and quality).
- Evaluate cultivars for regional adaptation to production and market preferences.
- Test 30% shade cloth versus full sun in improving plant quality in the field.

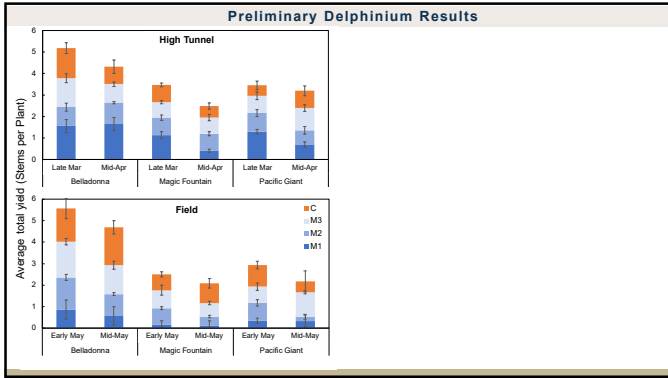
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Delphinium and Larkspur Methodology

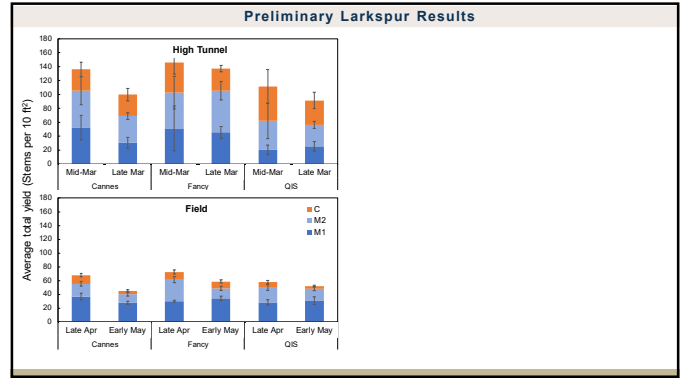
- Average last frost date in North Logan: 15-May
- Delphiniums transplanted- late March and mid-April (high tunnel); early and mid-May (field).
- Larkspur direct sowed- mid- and late March (high tunnel); late April and early May (field).
- Harvested and graded by marketability. Data taken by production system, planting date, cultivar, and color.

Larkspur (Consolida ajacis)

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Irrigation of dahlia

Cambry Adams

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Dahlia Irrigation Study

Key Objectives:

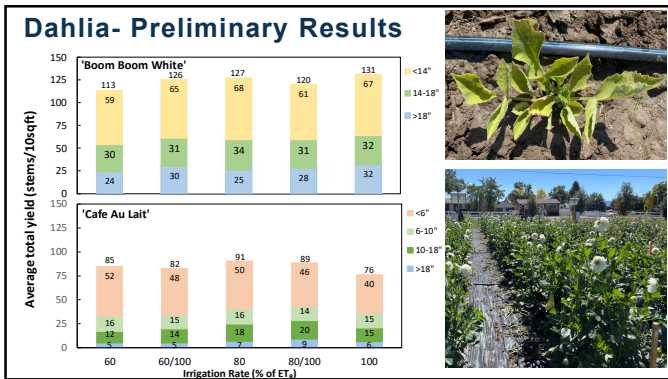
- Establish irrigation recommendations with 'Boom Boom White' and 'Café Au Lait'
- Measure soil moisture, temperature, plant height/canopy size, plant health, harvests (including timing and quality), and tuber weight
- Provide outreach and education on irrigation and implementation of conservation recommendations

Irrigation Rate [% of ET _{ref} at 10 ft]	Inches of water/week	Minutes/week*
60	0.9 to 1.5	50 to 100
60/100	0.9 to 1.5/ 1.5 to 2.5	50 to 100/90 to 170
80	1.2 to 2.0	70 to 140
80/100	1.2 to 2.0/ 1.5 to 2.5	70 to 140/90 to 170
100	1.5 to 2.5	90 to 170

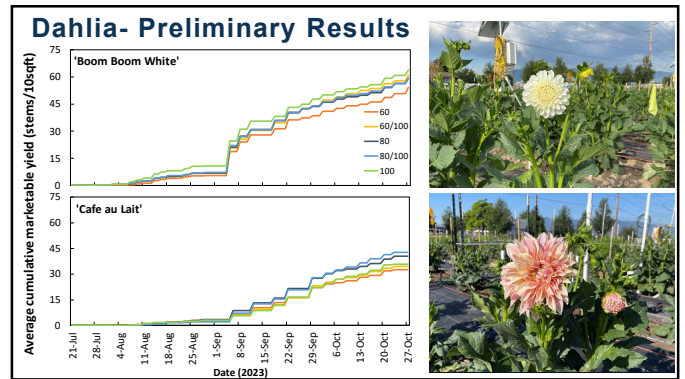
*With Toro Aqua-Traxx, 1.29 inches per hour @68.9kPa drip tape

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Restricted irrigation with warm-season annuals

Olive Stewart



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Warm Season Annuals (WSA): Objective


Assess the performance of six cut flower crops under restricted irrigation (<1.5" per week).

- Three production systems: High Tunnel (HT), Field-bare, Field-wool mulch
- Cultivar performance (1-4 cultivars per crop)
- Crop timing, yield, quality, and market
- Labor needs: set up, weed management, trellis systems, post-harvest clean-up
- Environmental conditions: soil moisture & soil temperature

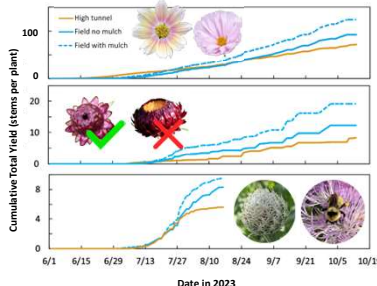


Wool Mulch vs Bare Soil

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WSA: First Year Results

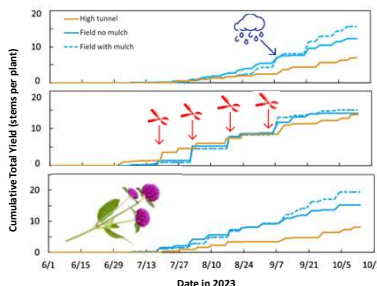


- **Cosmos:** 50-60 days to maturity
 - 40% increase in late season production compared to early summer
 - Differences in production by cultivar (Apricot Lemonade vs Cupcake)
- **Strawflower:** 75-85 days to maturity
 - 82% of all stems were marketable
 - Specific harvest time at the "bundt cake" stage
- **Centaurea:** 65 days to maturity
 - Variable ideal harvest stages
 - 2x increase of yield in late July
 - Popular with pollinators

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WSA: First Year Results



- **Dianthus:** 90-120 days to maturity
 - Blooms increased later in the season (late Aug. to early Oct.)
 - Early Sept. rainstorms result in inflection point between mulch vs bare
- **Statice:** 90 days to maturity
 - HT production started 1 month earlier
 - Long recovery period between harvests and late ideal bloom stage
- **Gomphrena:** 90+ days to maturity
 - Adjust initial cut for longer stems by leaving extra buds
 - HT was less productive (the reason is still being analyzed)

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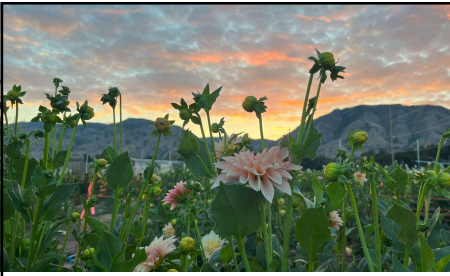
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Summary of preliminary research

- No recommendations YET! Trials began in 2023. We'll see in '24-25.
- Delphinium and larkspur
 - High tunnels improved yield. Planting earlier, the better for both crops.
 - 2nd vs. 1st yr delphinium production? Fall dates for future work?
- Dahlia irrigation
 - Strong potential to save water. Importance of monitoring and adjusting irrigation throughout the season. We applied <2" of water per week.
 - Next steps – environmental data analysis.
- Warm-season annuals with restricted irrigation
 - Greater yield in the field than tunnel, and with wool mulch vs. bare soil.
 - Next steps – cultivar and environmental data analysis.
- Upcoming field day workshop at our farm in late July 2024!

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Thank you!

- Chad Page
- Claudia Nischwitz & Plant Pathology Lab
- James Frisby
- Isaiah Williams
- Theresa Lara
- USU IPM Team
- Heather Warner
- Heather Griffiths
- Alyssa Palmer

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