High Tunnel Production of Annual Cut Flowers
Maegen Lewis, Brent Black and Larry Rupp

Cut flowers are a potential high value crop for small farms that hasn’t been fully explored for Utah, partly due to a lack of region-specific information. The research objective of developing management strategies of two representative cool season annual crops, snapdragon (Antirrhinum majus) and sweet pea (Lathyrus odoratus) will be of use to Utah high tunnel growers. Results indicated an increase in quality and stem length of snapdragons grown in high tunnels. Sweet peas have shown increased quality when grown during cooler months in high tunnels.

MATERIALS & METHODS - Snapdragon
Snapdragon (Antirrhinum majus) ‘Rocket’

Treatments
• 4x4 spaced non pinched
• 9x9 spaced pinched
• 4 semi-monthly planting dates

March – April (Fig. 1)
Data Collection/Grading
• Harvested every 3 days
• Graded according to florist standards
length, floret quality, straight stems (Fig. 2)

RESULTS - Snapdragons
Treatments with high tunnel plastic in spring and shading in summer improved stem quality, length, and marketability while yields were similar between treatments. (Fig. 5)

There was no effect of planting date on yield or quality, but early season harvests had higher marketability and fewer culls than late season. (Fig. 6)

Non-pinched stems had more marketable stems/ft² but also had more culls/ft². (Table 1)

‘Rocket’ stems typically had strong stems, full floral spikes and marketable lengths ranging 20-40 inches. (Fig. 2)

MATERIALS & METHODS – Sweet Pea
Sweet Pea (Lathyrus odoratus)
‘Mammoth’, ‘Elegance’, ‘Royal’ and ‘Spencer’

Treatments
• Sweet Pea – 2 replicate plots
• 8” spaced plants trained to a 6’ trellis (Fig. 3)
• Planted May 2 in tunnel

Data Collection
• Harvested every 2 days
• Recorded by stem length in inches (Fig. 4)
• Graded by florist standards (floret quality and stem length)

RESULTS – Sweet Pea
Yield increased throughout the summer but quality decreased with high temperatures and significant insect damage. (Fig. 7)

Majority of culls had stem lengths below the 8” grading limitation and insect damage later in the season. (Fig. 10)

‘Mammoth’ and ‘Elegance’ had higher yields than ‘Spencer’ and ‘Royal’ cultivars. (Fig. 8)

High tunnels resulted in greater yields but did not impact quality compared to field plots after July.

CONCLUSION - Snapdragons
• High tunnels increased stem quality. (Fig. 5)
• 9” spacing is preferable for lowering initial costs and labor time.
• Second production peak wasn’t cost effective, plants could potentially be removed after July and followed by a second planting for fall. (Fig. 6)
• Thrips, aphids and caterpillars were minimal and easily treatable.
• Potential sales - $4,047 based on a 14’x39’ tunnel and 9” spacing

2018 Plans
• Cultivar trials ‘Chantilly’, ‘Potomac’ and ‘Animation’.
• Determine optimum planting date for increasing yield and quality

2018 Plans
• More extensive trialing of ‘Elegance’, ‘Mammoth’ and ‘Spencer’ cultivars.
• Earlier planting date to capture cooler season.

CONCLUSION – Sweet Pea
• High tunnels did not extend the harvest window earlier in the season, most likely due to a late planting date in May.
• Insect problems were significant. Aphids were treatable but mites could not be controlled by pesticides without damaging the crop. The use of a sacrificial crop or insect trapping row within the tunnel may have value for this crop. (Fig. 10)
• Not cost efficient in mid to late summer due to high labor costs and low quality stems (Fig. 7)
• High market value for sweet peas at $1.25/stem on average through May.

Figure 1. Snapdragon planted high tunnel with varying dates and spacing’s.

Figure 2. ‘Rocket’ snapdragon grading by florist standards 36”-18”

Figure 3. ‘Rocket’ snapdragon planted high tunnel with varying dates and spacing’s.

Figure 4. Sweet pea ‘Elegance’ grading by stem length 5” – 12”

Figure 5. Snapdragon stem harvest by date. Note high yields in early July.

Figure 6. Stem marketability for high tunnel grown snapdragons

Figure 7. Sweet pea cultivar marketability comparison

Figure 8. Marketable vs. Culls ‘Elegance’, ‘Mammoth’, ‘Royal’ and ‘Spencer’ sweet peas

Figure 9. Shaded snapdragon high tunnel before harvesting

Figure 10. Mite damage on sweet pea vines

Figure 11. Sweet pea high tunnel in late June with shading

Table 1. Comparison of 4x4 and 9x9 yield/sq. ft. of ‘Rocket’ snapdragons

Average yield per square foot of ‘Rocket’ snapdragons planted at two spacing’s

<table>
<thead>
<tr>
<th>Spacing</th>
<th>Marketable/ sq. ft.</th>
<th>Cull</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x4</td>
<td>17.50</td>
<td>4.85</td>
</tr>
<tr>
<td>9x9</td>
<td>14.88</td>
<td>2.52</td>
</tr>
</tbody>
</table>

Figure 1. Snapdragon planted high tunnel with varying dates and spacing’s.

Figure 2. ‘Rocket’ snapdragon grading by florist standards 36”-18”

Figure 3. ‘Rocket’ snapdragon planted high tunnel with varying dates and spacing’s.

Figure 4. Sweet pea ‘Elegance’ grading by stem length 5” – 12”

Figure 5. Snapdragon stem harvest by date. Note high yields in early July.

Figure 6. Stem marketability for high tunnel grown snapdragons

Figure 7. Sweet pea cultivar marketability comparison

Figure 8. Marketable vs. Culls ‘Elegance’, ‘Mammoth’, ‘Royal’ and ‘Spencer’ sweet peas

Figure 9. Shaded snapdragon high tunnel before harvesting

Figure 10. Mite damage on sweet pea vines

Figure 11. Sweet pea high tunnel in late June with shading