Horticulture

EXTENSION
UtahStateUniversity

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October 2019 Horticulture/Small Acreage/2019-01pr

Sweet Pea Cut Flower Production in Utah

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Introduction

Sweet peas are a cool-season annual in Utah, and cut flower production is improved with the use of high tunnels. Sweet peas should be transplanted early in the spring and harvested until hot summer temperatures decrease stem length and quality. Sweet peas require a strong trellis, high soil fertility, and frequent harvesting. Tunnel-grown sweet peas began producing 4 weeks earlier and had 15% more marketable stems than a field-grown comparison crop in North Logan, Utah. However, our hot, semi-arid climate, combined with insect pressure limited success in our trials.

How to Grow

Soil Preparation: For optimal growth, sweet peas require rich, well-drained soil. Incorporating an inch of compost into the soil prior to planting can increase fertility, drainage, and organic matter, without creating pH or salinity problems. Conduct a routine soil test to determine any soil nutrient needs prior to planting sweet peas. Soil testing is particularly important when planting in new locations, and should be repeated every 2 years. USU's Analytical Laboratories performs soil tests. Pricing and information for collecting and submitting a sample is available on their website.

For sweet peas grown in a high tunnel, begin planning and maintaining the high tunnel during the previous fall to ensure the soil will be workable very early the following spring. In particular, install the plastic high tunnel covering in the fall, prior to heavy rain and snowfall. If the plastic is installed after heavy precipitation, moisture will be trapped in the tunnel and soil can remain too wet. This makes very early spring planting challenging and increases the risk of disease.

Figure 1. Spencer and Elegance sweet peas.

Germination: Sweet peas are cool-season, frost tolerant plants that require soil and air temperatures to remain below 80°F for best germination and plant growth. The seeds should be soaked for 24 hours in room-temperature water prior to planting because of their hard seed coats. Germination will occur in 14-21 days when temperatures are maintained between 50-65°F (55°F is ideal). At lower temperatures, seeds take longer to germinate and their overall germination rate decreases.

Transplanting: Starting seeds indoors is recommended because it improves emergence rate and give plants a jumpstart on the season. Sow seeds indoors 4-6 weeks before they will be transplanted. Sweet peas for transplanting into high tunnels should be seeded in December to be ready for transplanting in late winter (February for the Wasatch Front). For outdoor planting (field-grown), sweet peas should be started indoors in January so that they are ready to be transplanted as soon as the soil can be worked in the spring (March/April for the Wasatch Front).

Use a peat/perlite soilless media, a deep-cell tray or 3-4 inch deep pots, and sow two seeds per cell, approximately ½ inch deep. Keep the surface moist, but not saturated, until seedlings emerge. After emergence, begin watering deeply to moisten the entire cell. If both seeds emerge, wait until the true leaves develop, then thin to one plant per cell, selecting the stronger of the two plants. To encourage lower branching at the base, pinch off the tip of the stem once the plants reach 4-6 inches tall.

Spacing: For both high tunnel and field-grown sweet peas, plant double rows, spaced 8-12 inches apart with a trellis running between them.

Transplant sweet peas 8-12 inches apart in each row. Leave 5-8 feet between double rows to allow room for wide vine growth. If growing in a high tunnel, remember that space is limited and careful planning is required. USU's low-cost high tunnel is 14 feet wide and 7 feet tall at the center and holds two double rows spaced 5 feet apart from the row center (Figure 2).

Figure 2. Sweet peas under shade cloth in a high tunnel structure. Rows were spaced 5 feet apart and nearly grew together by the end of the season.

Direct Seeding: Though transplanting is recommended, direct seeding into a high tunnel can be done once the air temperature in the tunnel reaches 50-65° F during the day. Field-grown sweet peas should be direct-sown 6 weeks before the average last spring frost. Plant seeds ½ inch deep, spaced 1-2 inches apart in the row. Once true leaves develop, thin to 8-12 inches apart.

Trellising: Sweet peas must have a strong structure to support the tall plants. Installing metal 6-foot T-posts every 8 feet and attaching trellis netting (Figure 3) is a simple, effective trellis system. To achieve greater trellis height, we zip-tied ¾ inch PVC sections to each T-post that extended an additional 3 feet above the T-post top. Taller T-posts could be used to avoid the PVC extension but installing taller T-posts should be done before the tunnel plastic is applied. Additional PVC was attached to the top row of PVC poles and was also zip-tied to the PVC high tunnel ribs. Tying twine string between the posts or using wire panels can also work. Some sweet peas are weak climbers and need to be tied to the trellis for effective climbing. This can be done with stretchable trellis tape and a plant tie machine (Figure 4). Once the vines are heavy and tall, weave bailing twine between the T-posts to hold up the vines.

Figure 3. Sweet pea trellis inside a high tunnel. Trellis netting is attached to T-posts with PVC pipe that extends the trellis height. 2x4 boards in the center of the tunnel are for added support against snow load.

Figure 4. Vines secured to the trellis netting (circled areas) using a plant tie machine.

Irrigation: To achieve maximum growth, sweet peas need a consistent supply of water. Apply 1 to 2 inches of water each week depending on temperature, growth stage, and soil texture. Very early spring plantings, especially in a high tunnel, may require less water, depending on growth rate and soil moisture at planting. For high tunnel plantings, water may need to be supplied from a freeze-protected culinary source, as most secondary irrigation systems in Utah are not turned on until later in the spring. Drip irrigation is ideal as it keeps moisture off the foliage and blossoms, and conserves water.

Fertilizer: Sweet peas are heavy feeders, but plants will create lush foliage and fewer blooms when too much fertilizer is added. In general 0.25 lbs of nitrogen should be added per 100 square feet. For example, this amounts to 0.5 lbs (about 1 cup) of conventional urea fertilizer, or 1.6 lbs (about 5 cups) of organic 16-0-0 fertilizer. Apply half of the nitrogen before or at planting and side-dress the other half during the growing season. Phosphorous and potassium should only be applied based on a soil test, as these nutrients can build up in the soil. USU's Calculating Fertilizer for Small Areas is a useful tool for calculating applications.

Harvest and Storage: Depending on temperature and variety, sweet peas begin flowering about 9 weeks after transplanting or about 15+ weeks after direct seeding. Be sure to harvest all of the blooms or deadhead to avoid setting seed, which decreases flowering. Harvest during the cool parts of the day and when the stems still have two unopened flowers at the tip (increases vase life). Depending on grower and market preferences, single stems or a section of the vine with multiple stems can be marketed. Florist-grade single stems should be a minimum of 8 inches long with a preferred length of 12 or more inches. Place the cut stems directly into water during harvest to avoid wilting. After harvest, clean the stems, freshly cut the ends, and place in fresh water with floral preservative. Move the cut stems into cool storage (32-36°F) as soon as possible. Cool storage is effective for 2-3 days, but quality will decrease with longer storage. Trim stems and refresh water with floral preservative on a regular basis to extend stem life.

Vase Life: Sweet peas have a relatively short vase life of 4-5 days. Floral preservative modestly increases vase life by about 2 days.

Table 1.Insect pests of sweet pea.

INSECT	IDENTIFICATION	CONTROL
APHIDS	Soft-bodied, sap-sucking insect. Can be green, yellow, or black. Populations can build up very rapidly. Sticky honeydew from the aphids can accumulate on leaves and stems.	Encourage natural predators by avoiding broad-spectrum insecticide applications. Ladybeetle releases inside a high tunnel can be effective but they will leave the area over time. Apply insecticidal soaps and oils are the best choice for most situations.
WESTERN FLOWER THRIPS	Very small insect with fringed wings feed on flower buds and leaves. Leaves will develop a stippled appearance and petals deformed or discolored.	Chemical control is difficult. Malathion only protects for 2 days and kills beneficial insects. Keep weeds (often host plants) clear of the area.
TWOSPOTTED SPIDER MITES	Very small (0.02”), feed primarily on the underside of leaves and cause stippling (light dots) on the leaves that turn bronze then brown and fall off (Figure 5). Sometimes confused for leaf burn. Form webbing that covers leaves.	Provide adequate irrigation to avoid stress. Control surrounding weeds. Keep dust to a minimum (avoid rototilling between rows) as dust increases mite activity. Avoid/limit broad-spectrum insecticide treatments as mite outbreaks often follow. Spray plants with water, insecticidal oils, or soaps.

Table 2. Common diseases of sweet pea.

DISEASE	Identification	Control
ROOT, STEM, AND CROWN ROTS	Fungi that infect roots and crowns of plants. Dull-colored foliage or wilting followed by yellowing of plants. Plants may be stunted and then eventually die. Roots are dark, soft, or decayed.	Avoid excessive irrigation/moisture. Plant in well-drained soil. Where soil is heavy, use raised beds to improve drainage. Dig out and destroy infected plants.
POWDERY MILDEW	A fungal disease that produces a white or light gray powder on leaves, stems and occasionally flowers. Early season infestations should be controlled. If late in the season, chemical control may not be warranted.	Spray with copper fungicide. Cut down, remove and destroy all stems of the plant after fall freezes. Keep area weed and debris free.

Figure 5. Mite damage on sweet peas.

USU Variety Trial

In 2017 and 2018, we grew four varieties of sweet peas in a low-cost high tunnel that was 42' L x 14' W. In 2018, a field-planted (unprotected) comparison was added. Variety mixes from the Elegance, Mammoth, Royal (2017 only), and Spencer (2018 only) series were trialed. Elegance is an early flowering series under short day, low light conditions. Mammoth is an early flowering series that is known to be more tolerant of drought and heat. Spencer is a late blooming series that requires 12-15 hours of daylight to flower. The Royal series has a long blooming period and large blossoms. Sweet peas were transplanted into the high tunnel on May 2, 2017 (later than ideal) and on February 27, 2018. The field-grown sweet peas were transplanted on March 20, 2018.

Series Comparison

Overall, 'Elegance' and 'Mammoth' outperformed the other varieties each year. Despite 'Elegance' being classified as an early sweet pea and 'Spencer' as a late bloomer, the bloom times of these two varieties were similar in the high tunnel. All of the series had a similar fragrance strength, vine vigor, and susceptibility to insects. However, stem length and flower quality varied by time of year, cultivar, and flower color within each cultivar. The 'Elegance' Formula Mix produced about 80 marketable stems per linear foot (Figure 6), and the greatest percentage of stems longer than 12 inches in 2018. The color mix included several shades of red and pink, two shades of purple, and blue and white. The red and purple hues of this cultivar had the longest stems, on average.

The 'Mammoth' Choice Mix produced the greatest number of stems in both years and had a similar percentage of long, marketable stems as 'Elegance' (Figure 6). Colors included a mix of burgundy, deep rose, lavender, blue, rosy pink, salmon, scarlet, and white. This cultivar produced a greater amount of marketable stems during the warm months of June and July than other types.

The 'Royal' Mix had the greatest percentage of long stems for the 2017 season, but was the least productive: both 'Mammoth' and 'Elegance' produced 25% more stems than Royal during 2017. Colors were comparable to the 'Elegance' mix and included red, purple, mauve, pink, blue, and white. 'Spencer' Ripple Formula Mix have a range of bi-color that are popular, but trials showed low productivity and fewer long, marketable stems (Figure 6). Within the Spencer Ripple Mix, the deep purple nimbus, red and burgundy, all with white flecks, typically had longer stems than the other colors and was popular with florists.

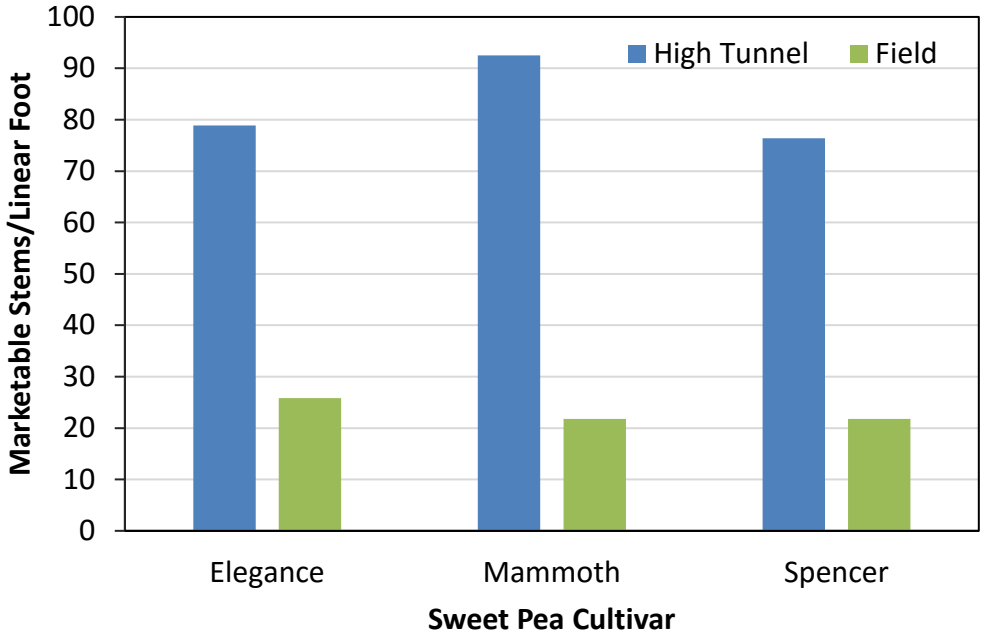

Figure 6. Sweet pea yield (average marketable stems per linear foot) by series (Elegance, Mammoth, and Spencer) for High tunnel (black bars) and Field (gray bars) production in 2018.

Harvest Window

In 2017, our late-planted high tunnel sweet peas began flowering on June 19 and harvest continued until fall. After late-July, stem marketability decreased significantly. In 2018, to decrease labor costs and free up tunnel space, we stopped harvesting on June 25, when stem quality and plant health began to decline due to warm conditions (Figure 7). Harvest in the high tunnel began 4 weeks earlier than the field (Table 3). Field-grown sweet peas were harvested for 2.5 weeks after the high tunnel harvests were completed.

Table 3. Dates of the harvest window and the harvest window length (in days) for sweet peas grown in a high tunnel (2017 and 2018) and an unprotected field (2018).

	1st Harvest		Peak Harvest		Last Harvest		Harvest Window (d)	
Year	Tunnel	Field	Tunnel	Field	Tunnel	Field	Tunnel	Field
2017	19-Jun	-	25-Jul	-	7-Sep	-	80	-
2018	1-May	5-Jun	18-Jun	2-Jul	25-Jun	11-Jul	55	36

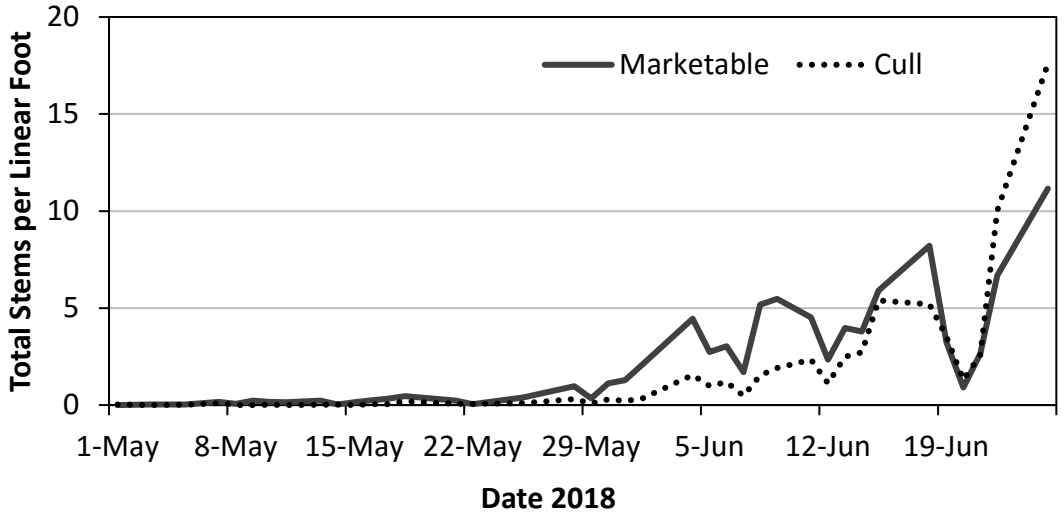

Figure 7. The total number of sweet pea stems, graded as marketable (solid, black line) and culled (dashed, gray line), harvested from a high tunnel over the 2018 production season.

Marketability

Sweet pea production is known for higher cull rates, compared to other cut flowers. Marketable stems are blemish-free, long (at least 8"), and straight. Early planting dates and the use of a high tunnel significantly improve stem marketability. In 2018, 56% of the harvested stems were marketable across cultivars, which was the highest rate we achieved for sweet peas (Table 4). Plants grown in a high tunnel produced 15% more marketable stems than those grown in the field and had a longer harvest window (Table 4).

When sweet peas are planted late (such as in the 2017 trial), plants will not have enough time to grow under cool temperature conditions that are optimal for production. As a result, only 23% of the harvested stems (across cultivars) were marketable from the late planting (Table 4). In addition to planting date, significant mite damage can also decrease plant health and stem marketability (Figure 5).

Table 4. Marketable (% of total) sweet pea stems harvested over 2 years. Stems were considered marketable if they were 8 inches long, straight, and undamaged.

	Marketable Stems (%)		
	2017	2018	
	High	High	
Cultivar	Tunnel	Tunnel	Field
Elegance	14%	59%	43%
Mammoth	25%	54%	40%
Royal	31%	-	-
Spencer	-	54%	39%

Economics

Florists use sweet peas for their strong fragrance, and prefer long, straight stems that have at least 2 to 3 open blooms. Typically, florist-quality stems are classified as at least 12" long, but many wholesalers also offer 8-10" long stems at a reduced rate. In our trials, most stems were in the shorter length category. Sweet pea stems in the Cache Valley market were sold in bundles of 10 and priced according to stem length. Bunched stems between 10-14" sold for $5.00 and bunched stems between 8-10" sold for $2.50. Florists offering higher-end arrangements for weddings, rather than weekly bouquets, primarily purchased sweet peas, which limited the sweet pea market. Depending on your market, sweet pea prices may not justify the cost of high tunnel production.

Conclusion

Planting sweet peas early in the year provides extended, cool-season conditions that are critical for producing a high quality crop and maximizing yield in Utah. High tunnels allow for earlier planting than in the field and therefore, a longer growing period under cool temperatures. In our conditions, Elegance and Mammoth series had the greatest number of marketable stems and are recommended for Utah sweet pea production. Color trends and market demands should also factor into cultivar selection if growing for the cut flower industry.

Sweet peas are a classic and beloved flower. Before growing them, the production needs and challenges (high cull rates, relatively low price, and limited florist market) should all be considered. For high tunnels, where space is limited and very valuable, growers must weigh the benefits of growing sweet peas with the profitability of other cut flowers.

Additional Resources

Johnny's Selected Seeds. 2016. Sweet Pea Production. Growing Guide 8171. https://www.johnnyseeds.com/growers-library/flowers/sweet-pea-production.html

Sweet peas. Cornell University College of Agriculture and Life Sciences. http://blogs.cornell.edu/hightunnels/flowers/cut-flowers/cut-flower-crops/sweet-pea/

This project is funded in part by USDA-Risk Management Agency and the Utah Department of Agriculture and Foods Utah Specialty Crop Block Grant under a cooperative agreement. The information reflects the views of the author(s) and not USDA-RMA or UDAF.

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