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Ranunculus Cut Flower Production Budget, One High Tunnel, Northern Utah, 2022

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This budget contains costs (preplant and site preparation, establishment and maintenance, and harvest and processing) and returns for the production and sale of ranunculus cut flowers that were grown in a high tunnel (14 feet by 40 feet). Production methods, yield, costs, and pricing were determined from Utah State University (USU) research trials, as well as feedback from Northern Utah producers. The costs and returns represent typical production in Northern Utah but should be adjusted where necessary for individual situations. Site selection, tunnel use, variety, harvest timing, pest management, and other practices will impact costs and returns to a cut-flower operation.

Farm and Production System

This publication assumes the use of one 14' x 40' high tunnel (see Black et al., 2008) with two beds, each 4' x 36' and 6.5' apart from center to center (i.e., 288 ft² of total production space), using color mixes of 'Amandine' and 'LaBelle' ranunculus planted in native soil with drip irrigation. Ranunculus tuberous roots (TRs) were soaked in water for 3 hrs and fungicide for an additional 20 minutes, before being 'presprouted' (established in trays of moist potting mix for 2 weeks) and planted in November. A high tunnel this size uses less than 2% of one acre and is assumed to be on land already owned. However, \$45 is used as a proxy for the land cost (1% of a \$4,550 per acre lease) with the assumption that urban land rental is greater than rural (USDA-NASS, 2022).

Crop Pricing

Stem pricing was calculated based on wholesale market testing conducted with florists across Cache Valley and

the Wasatch Front from April through July of 2021 and 2022. Average prices were used to calculate revenues in Table 1. High-quality, marketable stems were sold in bundles of 10 stems for \$15.00 (\$1.50 per stem). Stems were harvested when fully colored at the 'marshmallow' stage and graded as marketable when they were at least 10 inches long, straight, and undamaged. Cull stems were shorter than 10 inches, deformed, or damaged. Stems were sold through a local cut flower co-op located approximately five miles from the farm for a fee of 30% of revenue, which is calculated as 100% of marketable stems sold. The co-op fee and labor and mileage for delivery to the co-op are included in budget expenses.

Calculated Yield

A yield of six marketable stems per plant was scaled to account for 994 plants in the high tunnel at a 6"x6" spacing across a 288 ft² space, resulting in 5,964 stems (596 bunches) across a 10-week harvest period. This yield represents a consistent, mid-range yield from USU trials, though ranunculus yields can be highly variable, with reported marketable yields ranging from 2 to 12 stems per plant (Bernstein et al., 2008; Wien, 2014). Local grower feedback indicates yields up to 14 marketable stems per plant are attainable with ideal conditions and management.

Supplies

Production supply costs were based on average prices available in Logan, UT, and online in summer 2022, and may vary across regions, suppliers, and time. All supplies must be purchased in year 1, but many last

multiple years. Therefore, the cost of each input is annualized across the quantity used per year and the number of years until replacement.

Preplant and Site Preparation

- Tiller rental. One, half-day rental annually.
- Urea fertilizer (46-0-0): Each year, 2 lbs. of a 5-lb bag are needed, so one 5-lb bag is purchased every two years.
- Triple super phosphate fertilizer (0-45-0): Each year, 1.4 lbs. of a 5-lb bag are needed, so one 5-lb bag is purchased every three years.
- Muriate of potash fertilizer (0-0-60): Each year, 1.2 lbs. of a 5-lb bag are needed, so one 5-lb bag is purchased every four years.
- Drip irrigation kit: Each year, 320 ft of dripline will be used and replaced from a kit with 1000 ft of dripline. A new kit is purchased every three years.

Establishment and Growth

- Ranunculus plant stock: Assuming that all TRs are replaced annually, 994 TRs are needed each year.
- Captan fungicide: Each year, 2 oz. of an 8-oz bottle are needed, so one 8-oz bottle is purchased every four years.
- Plastic trays (1020 size): For presprouting, 25 trays are needed, as each tray holds 40 TRs. Trays are replaced every five years.
- Potting mix: Each tray requires 0.3 cubic feet of potting mix for presprouting, so 9 cubic feet are needed to fill all the trays. Three, 3.8 cubic ft bags are purchased each year for presprouting.
- 5-tier shelving unit: This serves as a proxy to estimate the cost of the space needed to store the trays of tuberous roots while they are presprouting.
- Water usage: One high tunnel requires 23 irrigation events, with 130 gallons of water applied per event, resulting in the use of 3,000 gallons of culinary water from November through June. However, irrigation frequency and amount are dependent on month and environmental conditions. The price of water per 1,000 gallons varies across Utah, and a mean residential rate of \$2.48 per 1000 gallons is used here (Utah Division of Drinking Water, 2015).
- Rodent bait: One package contains 16, 4-oz packets and four packets are used each year. One package is purchased every four years.
- Slug bait: Each year, 0.25 lbs. of a 1-lb package are used, so one package is purchased every four years.

- Ant bait: One package contains 24 bait stations, and six packets are used each year. One package is purchased every four years.

Harvest and Processing

- Harvest snips: One pair is replaced after two years.
- Buckets: Six, 5-gallon buckets are needed each year and should be replaced every four years.
- Floral preservative: Each year, 1 lb. of a 5-lb package is used, so one package is purchased every five years.
- Rubber bands: One, 1 lb. bag is purchased and used each year.
- Bouquet sleeves: Bunches are wrapped before sale based on florist preference. One square of brown kraft paper can be cut in half to wrap two bunches of flowers; 1 bundle of 2200 kraft paper squares is purchased every four years.

Hired Labor

Labor was priced at \$16.80 per hour (\$15.00 per hour plus employer-related costs), per feedback from local growers and within the mid-range of non-supervisory wages reported by the USDA-ERS (2022). Labor costs may vary depending on region and experience.

Depreciation

Straight line depreciation was calculated for the high tunnel with no salvage value assumed at the replacement year. Initial costs were divided by the number of years until materials need to be replaced to determine the annual depreciation cost. High tunnel calculations were based on the low-cost high tunnel used by USU (Black et al., 2008), with costs updated to represent 2022 prices (Rauter et al., 2022). Costs will vary depending on the design and materials used.

Net Returns and Other Considerations

Using the assumptions above, the net returns from a 14' x 40' high tunnel are \$2,819.49 (\$5.03 per sq. ft) for the harvest period (Table 1). There are multiple factors that can have a significant impact on net returns. These include pricing differences at sales outlets and geographical area, as well as production decisions.

Markets and Yield

The returns in Table 1 are based on selling 100% of the marketable stems at \$15 per bunch of ten stems. This assumed six marketable stems harvested per plant.

Both the number of marketable stems and percentage that can be sold will vary. Table 2 shows the returns associated with altering the percent of stems sold from 50% to 100% and yield from 2.5 to 10 stems per plant. The return is positive with a yield of at least five stems per plant and selling 75% of the marketable stems. Lower yields or lower percentages sold would result in low or negative returns. Depending on local demand, 8 to 10" stems may be marketable at a reduced price (e.g., \$12 per bunch of ten stems) to increase revenue.

There are other items that can affect net returns. Some cut flower farms sell directly to the final customer, such as at farmers markets or through subscriptions. Selling flowers as arrangements or adding on-farm experiences are other ways that individual farms may add additional returns. Additionally, with harvest ending by early June, ranunculus may be followed with a warm season crop to maximize use of the high tunnel space. This budget is meant to look at ranunculus production only and does not consider these alternatives.

Management Practices

Management practices, such as cultivar selection, planting date, winter insulation, and presprouting, can also influence net returns. USU research trials were conducted in North Logan, UT from 2020 to 2022 to determine ranunculus yield under combinations of management practices. All TRs were soaked in water for 3 hours and fungicide for an additional 20 minutes, before being directly planted or 'presprouted' (established in trays of moist potting mix for 2 weeks before planting). TRs were planted from November to March and either left bare or covered with AG50 frost fabric low tunnels (see Rauter et al., 2021) from planting until late April. Across both years of trials, ranunculus that were presprouted before planting in November and not covered with low tunnels produced the highest marketable yield of six marketable stems per plant. Budgets for the other management practices tested are presented in Table 3.

Summary

Ranunculus holds strong profit potential as a high tunnel cut flower crop in Northern Utah, with net range

projected returns of \$5.03 per sq. ft, assuming a mid-yield of six marketable stems per plant. Net returns vary with yield, marketing success, and management practices. Planting presprouted TRs in late fall is recommended to maximize returns.

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Table 1. Ranunculus cut flower production budget based on one, 14'x40' high tunnel (April to June harvest). Yields and costs are based on a presprouted, mid-November planting of tuberous roots (TRs).

REVENUES						
	Output	Units	Total Bunches	% Sold	Price/Unit	Total
	Marketable	Bunches	596	100%	\$15.00	\$8,946.00
TOTAL REVENUES						\$8,946.00

OPERATING EXPENSES						
Supplies	Input	Units	Price/unit	Quantity	Years to Replacement	Annual Expense
Preplant & Site Preparation	Tiller rental	Half day rental	\$50.00	1	1	\$50.00
	Urea fertilizer (46-0-0)	5-lb bag	\$16.00	1	2	\$8.00
	Muriate of K fertilizer (0-0-60)	5-lb bag	\$16.00	1	4	\$4.00
	Triple super phosphate fertilizer (0-45-0)	5-lb bag	\$16.00	1	3	\$5.33
	Drip irrigation kit	Kit	\$170.00	1	3	\$56.67
Establishment & Maintenance	Ranunculus TRs, 5-6 cm	100 TRs	\$52.00	10	1	\$520.00
	Captan fungicide	8-oz bottle	\$16.00	1	4	\$4.00
	1020 trays	10 pack	\$12.00	3	5	\$7.20
	Potting mix	3.8-cu.-ft. bag	\$38.00	3	1	\$114.00
	5-tier shelving unit	2 pack	\$210.00	1	5	\$42.00
	Water usage	1000 gallons	\$2.48	3	1	\$7.44
	Rodent bait	16 pack	\$17.00	1	4	\$4.25
	Slug bait	1-lb container	\$10.00	1	4	\$2.50
	Ant bait	24 pack	\$26.00	1	4	\$6.50
Harvest & Storage	Harvest snips	Snip	\$22.00	1	2	\$11.00
	Buckets	Bucket	\$5.00	6	4	\$7.50
	Preservative	5-lb bucket	\$22.00	1	5	\$4.40
	Rubber bands	1-lb bag	\$10.00	1	1	\$10.00
	Kraft paper sheets	1 bundle (2200 sheets)	\$86.00	1	4	\$21.50
Total Supply Expenses						\$886.29

OPERATING EXPENSES CONTINUED						
Labor	Input	Units	Quantity	Wage	Annual Wage	
Preplant & Site Preparation	Soil tillage	Hours	2	\$16.80	\$33.60	
	Apply fertilizer	Hours	0.5	\$16.80	\$8.40	
	Install irrigation	Hours	1	\$16.80	\$16.80	
Establishment & Maintenance	Presprouting labor	Hours	6	\$16.80	\$100.80	
	Planting labor	Hours	5	\$16.80	\$84.00	
	Pesticide applications	Hours	0.5	\$16.80	\$8.40	
	Hand weeding	Hours	20	\$16.80	\$336.00	
	Install plastic and shade	Hours	2	\$16.80	\$33.60	
	Ventilate and remove snow	Hours	12	\$16.80	\$201.60	
Harvest & Marketing	Harvest	Hours	36	\$16.80	\$604.80	
	Processing	Hours	36	\$16.80	\$604.80	
	Delivery to co-op	Hours	10	\$16.80	\$168.00	
Total labor expenses					\$2,200.80	

Delivery Fees	Description	Units	Quantity	Revenue	Fee	Total Cost
	30% delivery charge from co-op	Bunches	596	\$8,946.00	30%	\$2,683.80
	Mileage to co-op	Miles	100		\$0.52 per mile	\$52.00
TOTAL OPERATING EXPENSES						\$5,822.89

FIXED EXPENSES						
	Input	Units	Price/unit	Quantity	Years to replacement	Annual expense
Annual Depreciation High Tunnel	High Tunnel (14'x40')	High tunnel	\$1,050.00	1	8	\$131.25
	Initial construction labor	Hours	\$16.80	20	8	\$42.00
	Plastic film (6 mil 24'x50')	Roll	\$194.00	1	4	\$48.50
	Shade cloth (20'x48')	Roll	\$295.00	1	8	\$36.88
TOTAL FIXED EXPENSES						\$258.63

OWNERSHIP COSTS	
Land	\$45.00
TOTAL OWNERSHIP COSTS	\$45.00

TOTAL COSTS	\$6,126.52
NET PROJECTED RETURNS (14' x 40' High Tunnel)	\$2,819.49
NET PROJECTED RETURNS (ft²)	\$5.03

Table 2. Yield and marketing sensitivity on net projected returns for ranunculus cut flowers.

		Net Projected Returns ^a (per ft ²)			
% Sold	Yield	2.5	5.0	7.5	10
		-----stems per plant-----			
50%		-\$3.82	-\$1.49	\$0.84	\$3.17
75%		-\$2.65	\$0.84	\$4.34	\$7.83
100%		-\$1.49	\$3.17	\$7.83	\$12.49

^aCalculations assume a price of \$15 per bunch of 10 stems. Returns were calculated as shown in Table 1, with only the yield and percent sold varying while all other inputs were held constant.

Table 3. Management practice sensitivity on net projected returns for ranunculus cut flowers.

		Net Projected Returns ^a (per ft ²)							
Planting Date	Presprouting? ^b		Low Tunnel? ^c		Presprouting?		Low Tunnel?		
	No	No	Yes	No	No	Yes	Yes	Yes	
November	\$3.88		\$5.03		\$4.58		\$4.59		
January	\$0.15		\$0.16		\$0.19		\$3.45		
February	-\$0.99		\$0.16		-\$1.67		\$0.08		
March	-\$2.37		-\$3.56		-\$2.82		-\$1.67		

^aReturns were calculated using the same inputs as Table 1, assuming 100% of stems were sold at a price of \$15 per bunch of 10 stems, with yield and labor costs adjusted based on Utah State University research trials from 2020-22.

^bAll TRs were soaked in water for 3 hrs and fungicide for an additional 20 minutes, before being directly planted in the high tunnel or 'presprouted' (established in trays of moist potting mix for 2 weeks before planting in the high tunnel).

^cLow tunnels consisted of AG50 frost fabric over conduit hoops from planting until late April.

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