

# Case Study: Cramer's Posie Patch

**R**alph Cramer and his son and business partner, Keith, are well-known southern Pennsylvania cut and dried flower farmers. They are also pioneers in the usage of multi-bay high tunnels. Ralph serves as the Eastern U.S. sales agent for Haygroves, manufactured in Great Britain. Their one acre of Haygrove high tunnels complements the other 49 acres of annuals, perennials (15 acres), and woody ornamentals (4.5 acres) that include 130 varieties of flowers at Cramer's Posie Patch.

Ralph Cramer's parents, Lewis and Mary, were also Lancaster County farmers. Lewis teased his wife Mary about her "little flower growing hobby" so she began to keep records of the profit from her flowers and (unbeknownst to him) his tobacco. The next year, when he saw the figures, he wasn't laughing anymore, said Keith. The couple developed several famous lines of cockscomb that their son and grandson continue to raise and sell as improved varieties.

Ralph bought an additional farm in another part of the county and continued to grow flowers on its silty loam fields. Land quality is very good on this current site, and two streams allow for overhead irrigation of direct seeded annuals when rainfall is low. However, compared to the old farm perched on top of steep hills, this farm is somewhat of a "frost magnet" with a shorter growing season, and the coldest field is also their wettest. The farm is classified as Zone 6B or a cold Zone 6, with fall frost around the first week of October and the last frost free date around May 15.

Before they purchased their first Haygrove, they were looking for some sort of multi-bay season extension structure. At a West coast meeting of the Association of Specialty Cut

Flower Growers, the Cramers saw a homemade light-weight structure. Using it as a model, they built their own 1/6 acre tunnel, but a 20 mile per hour wind blew it down.

Keith explains why their experimental high tunnel failed. "The hoops in our homemade structure were made from rebar inserted through PVC pipe (to protect the plastic from rubbing), but the rebar was not strong enough to resist the wind pressure. We also had aligned our tunnels in a North/South configuration—which placed them sideways to the prevailing winds, making them even more vulnerable. We had no experience or advice about venting tunnels to prevent damage. We had no top rail or gantry of any type, thus the ropes could not be pulled tight to prevent the plastic from shifting and becoming a spinnaker in the wind."

Primed to grow in a multi-bay high tunnel, the Cramers discovered Haygroves and they traveled to England to see where they were commercially available. The structure impressed them, as did the Haygrove company's responsiveness to farmers' needs and ideas.

By enabling them to sell cut flowers both earlier and later and greatly improving size and quality in some cases, Haygroves have boosted the Cramers' business far out of proportion to the growing space they cover. With these structures, the Cramers achieve larger blooms and greater stem length for certain species and protect their flowers from disease and wind injury.

For many years the farm had only sold dried flowers. But the market for dried flowers is "soft," and storing dried stock hurts cash flow and takes up considerable barn space. The Cramers had trialed fresh flowers as an

afterthought, but wholesalers needed to see quantity. By 2001, four years after they decided to seriously grow fresh cuts, they accounted for more than half of total sales. Producing both fresh and dried flowers for different markets has given the Cramers a broader range of options than they previously had.

Most of the Cramers' fresh cuts go to 20 major wholesale florists in the mid-Atlantic, from New York's Finger Lakes region to Washington, D.C. Downward price pressures and the logistics of getting a truck into and out of the city by 7 A.M. have led them to avoid New York City buyers. A typical buyer will receive delivery of 20 buckets of flowers from Cramers' Posie Patch once or twice a week.

Working with large-scale wholesale buyers can be demanding. Early every morning, Keith faxes an availability list to these buyers. Each buyer's order becomes a cut list assigned to the farm's eight-person field crew. They cut, grade, and do quality control as piecework in the field. Availability lists are saved to guide planning for the next year's planting.

Bouquet makers who sell to big box stores like Costco are another category of buyer that take a significant volume of their flowers. For some flowers, these buyers are looking for different characteristics than the wholesale florists, providing the Cramers with a market for smaller stems.

Cramer's Posie Patch also ships dried flowers to designers and florists nationwide; sells seeds to commercial growers and three large seed companies (Gloeckner, Germania and Johnny's); and has a small, dried flower retail shop at the farm.

Large multi-bay tunnels make sense for the Cramers' production needs. With routine sales of 800 bunches at a time, they would rapidly clear out a single 30' x 100' high tunnel. Smaller, single-bay high tunnels are also less accessible for tractors and so require more hand labor.

The cost per square foot under cover is lower in Haygroves than in single-bay high tunnels. A one-acre Haygrove costs about \$28,000 (2006 price), including shipping and polyethylene film and the Cramers expect 15 to 20 years of use.

The Cramers take full advantage of the ability to manage each high tunnel bay independently. This flexibility allows them to tailor venting, shading, and irrigation practices to the temperature and humidity requirements of individual crops that fill a bay. With some experimentation, they identified species that are especially rewarding for them to grow in Haygroves. These include cockscomb, sunflowers, chili peppers, lisianthus, dahlias, and hydrangeas.

Cockscomb (*Celosia*) is the hallmark flower of Cramer's Posie Patch. Keith's grandparents selected this seed, and he and his father continue to do. In two bays the farm grows cockscomb as a cut flower. Once *Celosia* plants are established, warm temperatures (80°F) will promote flowering better than cool temperatures (below 50°F). Height of cockscomb is significantly greater, 4' to 4-1/2' in the Haygrove versus 3' in the field. The Haygrove also permits harvest to begin around July 6, a month earlier than field-grown.

This four or more week harvest advantage and superior quality brings a price that is 30 to 40% higher (\$4.15 per bunch versus the \$2.95 bunch price). They have been able to maintain that high wholesale price for all cockscomb stems cut during the season, whether grown in the tunnel

or the field. This represents a huge increase in profit.

Chili peppers grown in Haygroves have become an important element of the farm's product mix. High tunnels allow them to grow bigger peppers, early harvest, and 3' stems (compared to 14" or 16" for field-grown). In the tunnel most chili harvests begin in the first week of August rather than at the first frost (late September or early October) in the field. They grow the chilies in the warmest bay, which they vent less and irrigate more than the other bays.

In the Haygroves, the first sunflowers are harvested 3-1/2 weeks earlier. Local sunflowers are most in vogue in May, June and the first part of July, and early sunflowers help with perennial sales. The Cramers grow seven visually identical varieties of pollenless sunflowers with different maturation dates. Their early sunflowers get them in the door with their customers so they can sell other species of early field-grown flowers. They double crop sunflowers, so after the early crop is done, they remove the plants, make new holes in the plastic, and seed sunflowers for harvest after the frost.

During Hurricane Isabelle and other catastrophic wind and rain events, cut flower plantings in the Haygroves were barely affected. With their tunnels fully vented for the high winds, the tops kept approximately 80% of the soil dry. The tunnels diffused the wind as it moved through them. Straight line winds and saturated soil combined to level outdoor crops, including transplants on black plastic mulch. Sunflowers inside remained safe and sound while those in the field were uprooted.

The Cramers could not grow marketable lisianthus outside, but do so consistently in the Haygroves, where they raise 1/6 acre of the flower in four colors. This high-value, rose-

like cut flower species requires prolonged cool temperatures to develop stem length but cannot tolerate frost. They moderate temperatures by keeping the lisianthus bay open unless frost threatens, covering the beds in white plastic to reduce soil warming, and using shade cloth. In the Haygroves, lisianthus stems reach 3' in length (versus 9" in the field). "My customers are not interested in anything shorter than 20-24" stems," says Keith.

Hydrangeas (*Paniculata grandiflora*) are the first woody perennial the Cramers have tried in the Haygroves. They have been rewarded with more rapid growth and impressively large flower clusters. The trial was so successful, the Cramers have added a full bay (approximately 600 plants) of the variety 'Limelight.'

Making the right decision about when to cover multi-bay high tunnels is critical in regions with the possibility of late snowfall. The Cramers want to get the biggest jump on production that they can. Yet if they cover the tunnels too early, they run the risk that a late snowstorm will damage the structure, as they are not engineered for snow load. In their southern Pennsylvania location, they generally cover the tunnels around April 7 and plant them in mid-April. In the Spring of 2003, the structure withstood 5" of wet, heavy snow. They were able to "bump it off" without incident.

They aim to 'hibernate' (remove) the tunnel plastic in mid-October. They bring the top poly from two adjoining tunnels into the shared leg row, cover it with black plastic row mulch to prevent UV degradation, and secure it with tomato twine. They remove the doors and store them in the barn. Over the winter, they leave the side curtains hanging on the structure.

The first year they grew in the Haygrove, the Cramers gave their crew responsibility for recording daily

high and low temperatures in each bay. This data taught them that the normal temperature fluctuation is okay. They monitor the tightness of the ropes monthly. During thunderstorm season, they keep the tunnel fully vented for temperature control, with doors open and the roof clipped in the open position. As this is also the proper way to vent for high winds associated with thunderstorms, storms require no special intervention.

Blessed with good Lancaster County soils, the Cramers use a one-size-fits-all fertilizer program, the same in the Haygroves as outside. They apply a 19-19-19 fertilizer at the rate of 50 pounds of actual nitrogen per acre. After incorporating the fertilizer, they chisel plow, disc and lay plastic mulch.

For their Haygrove plantings, the Cramers use a flat plastic bed layer to apply 5' wide plastic mulch over a 4' wide planting area. They can just fit four of these beds per 24' bay. These are not raised beds because their raised bed shaper/plastic layer cannot squeeze four beds into a bay. They vary the color of the plastic mulch depending upon whether they want to warm or cool the soil. Chiseling in the fall helps the soil dry out faster in the spring, when they do most of their soil preparation and the plastic mulch laying. They would like to fully prepare the beds in the fall but winter winds loosen the plastic mulch.

Only transplants, set by hand, are used in their Haygroves. First, to correctly space holes in the plastic mulch, they use the waterwheel from a transplanter behind a tractor. While transplants mitigate risk, they require much more labor. In contrast, in the field they direct seed about 80% of their annuals—with two acres of seeding scheduled every two weeks. Only about five acres of flowers are transplanted in the field.

As controlling foliage wetness is a major high tunnel benefit, the Cramers only use drip irrigation in the Haygroves. “We don’t want to make it rain inside a tunnel,” explains Keith. Using transplants makes it feasible to use drip tape. Were they to direct seed, they would need to cultivate, which would damage drip tape. They use double drip tape per bed.

Haygroves vent high and provide excellent air exchange, therefore humidity is not a problem. Alex Hitt, who grows organic heirloom tomatoes in Haygroves and in single-bay tunnels in Graham, North Carolina, attributes the reduced disease of plants in the Haygroves to their superior ventilation. The internal humidity is similar to outside conditions when vented.

Powdery mildew is more prevalent under the dry conditions common to these high tunnels. The Cramers sometimes have powdery problems in the field during dry periods of the season as well. *Oxidate* and *Zerotol* are hydrogen peroxide products that they have used successfully to control this disease. As an added bonus, these pesticides have zero re-entry periods. They prevent powdery mildew from spreading by exploding the spores so they can’t attach to plant tissue. Existing powdery mildew growth—which has a grey powdery look—is not affected by these products; therefore, detecting this disease problem early is essential as flowers with grey mildew are obviously not marketable.

Under the Haygroves (as with greenhouses), dry season pests like aphids and spider mites are accentuated. The structures offer a perfect micro-climate and protect these pests from rain washing them away. Keith relies on chemical pesticides to control these pests, such as the broad-spectrum organophosphate *Orthene* against

aphids and several different miticides in rotation to avoid resistance.

In retrospect, the Cramers realize that a simple procedure would have eliminated weed pressure in the leg rows between bays. Before drilling the tunnel legs into the soil, they recommend making a shallow furrow (for runoff control) and pinning down narrow strips of black weed barrier fabric. In the absence of this prophylactic action, the Cramers apply *Roundup*. In the growing beds, plastic mulch eliminates the need for mechanical cultivation or herbicide applications, although some weeding must be done by hand in the plant holes.

Mid-weight floating row cover protects tender transplants coming from the greenhouse. Their crew lays this row cover over low wire hoops straddling the beds. Eventually, when the transplants outgrow the hoop, the row cover is removed. They use wide enough fabric to reach from one side of the bay to the other. When they pull it off, they move it to the center of the bay (keeping it out of the leg row where it could get wet), between the second and third beds.

These covers must be carefully managed to control excessive temperature and humidity. The Cramers learned the hard way. “The first year, we cooked over 4,000 sunflowers,” Keith recalls. In the spring, they can avoid excessive heat and provide adequate airflow just by opening the doors. A west wind keeps the air moving. When they have a stretch of cloudy weather followed by sun, they find it is important to remove the row cover and let the breeze in the doors. This dries out the plants’ micro-environment, preventing disease. It also hardens off the plants.

Haygrove recommends that the doors of the tunnel be aimed at the prevailing winds usually from the West. This satisfies ventilation needs

and protects the structure from severe winds. Many greenhouse designs suggest a North-South orientation for even sunlight on the plants because the trusses create quite a bit of shade. High tunnels have a lot less overhead steel to shade plants. Adequate light has not been an issue in the Haygrove tunnels.

The Cramers use shade cloth on lisianthus to reduce ambient temperature and elongate the stems by reducing light. Rather than covering the top of the high tunnel with shade net, they put it underneath—inside the tunnel. If it were outside, venting would become more difficult. Keith explains, “Our shade net is rolled out on top of ropes that we tie across the bay. They are approximately 7 feet above the soil, so we can walk under them. If needed, we can move the shade across the bay and store on the north side to give full sun to the crops.”

After four years of use, the Cramers are replacing their polyethylene cover with an improved greenhouse film called Luminance. It is designed to deflect a portion of infrared rays, reducing the highest temperatures in the tunnel. Some light is lost with this feature so to offset the loss, Luminance diffuses light, sending the available light into the plant canopy at different angles.

Cramer’s Posie Patch faces some difficult choices in charting its future course. One weak link is labor. Eight Mexican laborers legally brought into the country on the federal government’s H-2A Agricultural Guest Worker Visa Program constitute the farm’s field crew. Keith tolerates the program’s “red tape nightmare because it provides the qualified, legal, dependable workers needed to operate profitably.” To add more workers would require building more housing, and adding septic, electric, and other infrastructure. Alternatively, they could reduce

outside production and rely on fewer workers.

Haygrove Tunnels have fit nicely with the farm’s recent shift in emphasis to fresh cut flowers. The novelty of having local flowers earlier than other area growers makes the Cramers

popular with the major wholesale florists they supply. Being the first local grower with certain crops creates a definite customer loyalty. At the end of each season, most of his customers tell Keith, “Don’t forget me next year when you have the early stuff!”

<b>Enterprise Budget for Cockscomb in One Bay (1/6 Acre) of a One Acre Haygrove Tunnel at Cramer's Posie Patch</b>			
<b>Fixed Costs</b>			
<b>Construction Costs</b>		<b>Materials</b>	<b>Labor</b>
High tunnel construction			\$3,000
High tunnel frame		\$25,000	
<b>Subtotals</b>		<b>\$25,000</b>	<b>\$3,000</b>
<b>Total Construction Costs</b>			<b>\$28,000</b>
<b>Fixed Costs</b>			
High tunnel construction (divided by 15 years)			\$1,867
Interest (construction financed at 7% for 15 years)			\$980
Taxes, land, office expenses, fees			\$222
<b>Total Fixed Costs</b>			<b>\$3,069</b>
<b>Total Fixed Costs per Bay (1/6 Acre)</b>			<b>\$511</b>
<b>Variable Costs per Bay (1/6 Acre)</b>			
<b>Materials and Machinery</b>			
Seeds and growing out plugs			\$357
Fertilizer, lime and compost			\$10
Irrigation supplies			\$68
Plastic mulch and row cover			\$90
Pesticides			\$70
Poly covering (divided by 4 years)			\$200
Delivery costs			\$230
<b>Subtotal</b>			<b>\$1,025</b>
<b>Labor Costs (\$11/hr)</b>			
Cover installation and removal			\$110
Bed preparation and fertilization			\$22
Transplanting, laying drip tape and mulch			\$380
Pruning, trellising, irrigating, spraying, venting			\$220
Harvesting, grading, packing			\$2,400
Sales and delivery (\$14 to \$20/hr)			\$366
High tunnel clean-up			\$132
<b>Subtotal</b>			<b>\$3,630</b>
<b>Total Variable Costs per Bay</b>			<b>\$4,655</b>
<b>Total Costs per Bay</b>			<b>\$5,166</b>
<b>Revenues per Bay*</b>			<b>\$20,125</b>
<b>Net Returns per Bay</b>			<b>\$14,959</b>

\*Revenues are based on a harvest of 4,800 bunches per bay and a selling price of \$4.15/bunch (plus a total of \$105 in delivery fees).

Prior to the first fall frost, the Cramers' customers start to look to other suppliers in California, Holland, and South America. The uncertainty of the first frost date is a concern for their customers since they need to have a continuous supply of flowers. The summer season is very intense for all involved, with daily availability updates and a compressed schedule. Keith says that most of his customers

look forward to the more relaxed environment of standing orders, even though the product is not quite as nice or nearly as fresh.

Timing the late season crop is an ongoing challenge since the hard frost is unpredictable.

Moreover, by the time that hard frost ends the harvest, the wholesale market

has weakened so it is difficult to get the higher prices needed to justify tunneled production. With only an acre of tunnels, the Cramers cannot protect both the quantity and diversity of product that their wholesalers demand. For these reasons, the Cramers have decided concentrate on getting a jump on the harvest early, rather than keeping it going after the fall frost.