

Making the Most Out of Your High Tunnel Dollar



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Jay's Jellies Produce and More
Clay Center, Kansas

Our Farm

We live on 5 acres north of Clay Center. We have currently ½ acre in production. We started experimenting with High Tunnels in 2008 and built 2 in 2009. We built 3 more tunnels in 2010 with two being movable. In 2011 we will be replacing our smallest tunnel with a much larger model. We will have over 6,700 square feet under plastic in 2011.



Jams and Jellies



- A good use of blemished/extra produce
- Adds additional products to sell in early spring and late fall and winter
- Started with pepper jellies and have branched out to 17 different varieties

Farm Background

- Grew up on a swine, cattle and diversified crop farm north of Abilene, Kansas
- Family still raises show pigs and breeding stock



To Make the Most out of your High Tunnel Dollar, Consider the Following:

- Size of your Market Outlet
- Budget and Cost of High Tunnel
- Type of tunnel/materials
- Labor and Equipment
- Site Selection and Orientation
- Use of Space
- Crop Selection

Size of your Market Outlet

- Ask yourself:
 - Where can I sell?
 - How much can I sell?
- My Market outlets:
 - Manhattan and Clay Center Farmers Markets
 - Fall and Winter Online Market
www.nrb.locallygrown.com
 - Potential: Salina, Abilene, Concordia

Size of your Market Outlet

- Where can you sell your produce?
 - Farmers Market
 - CSA
 - Produce Auction
 - Restaurant
 - Grocery Store
 - Personal Use



Budget and Cost of Tunnel

- Budget
 - Based on potential income from market outlets
 - Find the point of diminishing returns
 - Minimize input
 - Maximize income
 - Don't overspend your market potential

Budget and Cost of Tunnel

- Funding Sources
 - Cash
 - Loans
 - Grants
- New or Used Building
 - New, many sources (remember shipping)
 - Used, Craigslist, EBay, Trade Magazines/Newspapers, Word of Mouth



Labor and Equipment

- Labor
 - You and Spouse
 - Family
 - Employees
- Different Jobs
 - Venting
 - Emergencies/Failures
 - Storms



Type of Tunnel/Materials

- Premade/Homemade
 - Homemade will be Cheaper
- Gothic/Arch
- PVC/Steel
 - PVC is Cheaper than Steel
- Stationary/Movable
 - Stationary is easier and cheaper

Type of Tunnel/Materials

- We have all these types
 - PVC
 - Steel
 - Arch
 - Gothic
 - Homemade
 - Premade
 - Stationary
 - Moveable

Homemade PVC

- 12 ft by 18 ft 1 inch PVC
- Cost around \$200
- Built in March of 2008, used 3 seasons, Died December 2010

Crops Grown

Tomatoes 2years
Pickling Cucumbers
Spinach
(overwintered)



Homemade PVC

Lessons Learned:

- Use 20 foot pieces of PVC
- DON'T USE ANY CONNECTORS, use 5/16 inch carriage bolts to connect purlin
- Use greenhouse grade plastic
- Needs better ventilation in the hottest part of the summer
- Unable to walk easily in



Homemade Cattle Panels Hoop Building

- 8 by 12, three cattle panels
- Had all materials lying around, cost was minimal



Homemade Cattle Panels Hoop Building

Lessons Learned:

- Strong
- Can't stand up in
- Pipe Insulation good way to cover the end of the cattle panels
- Only used one season



Homemade PVC 2.0

NEEDS:

- Better Ventilation
- Stand up along sidewalls
- Larger size
- Better Plastic



Homemade PVC 2.0

18 by 42, 4 foot sidewalls, 1 inch PVC on 3 foot centers



Homemade PVC 2.0

Construction: 4 by 4 Posts 10 foot center, set in the ground 3-4 feet, no concrete



Homemade PVC 2.0

Construction: 2 by 4 at the top and bottom 1 1/2 inch pvc 12 inches long driven into the ground every 3 feet



Homemade PVC 2.0

- 45 degree elbow on each end of a 20 foot pvc pipe, attach to a 4-5 foot piece of pvc pushed into the ground post. Attach elbow to hip board with pipe strapping and screws.



Homemade PVC 2.0

- Attaching plastic to the sidewalls, using the 2 furring strips



Homemade PVC 2.0

- End wall with plastic and OSB



Homemade PVC 2.0

- Sidewalls are pulled up and held with a piece of twine and there is a zigzag of twine on each side to keep it from blowing out.



Homemade PVC 2.0

Finally a 2 by 4 beam is placed down the center with 2, 2 by 4 posts. This gives extra support in the center. In the winter we add one extra beam to each side.



Homemade PVC 2.0

- Advantages:
 - \$500-\$600 construction costs
 - Better Ventilation
 - Stand up in
 - Covers more Ground, stays warmer at night
 - Strong enough to survive 70 plus mph winds and tornadoes

Homemade PVC 2.1

- Added Chainlink top rail, every third, to add more strength.
- Bent the pipe by using the endwall as a jig.



Homemade, Movable, Steel

- After attending last years GPVGC, decided I needed to try to build a movable tunnel.



Homemade, Movable, Steel

- Why Movable?
 - Increased production, multiple crops, one building
 - Fall production
- Each 16 by 32 movable building will cover 1,536 square feet of growing space, this pair of buildings will cover the same amount of space as a 30 by 100 stationary building

Homemade, Movable, Steel

Each building is 16 by 32, made with 1 3/8 galvanized tubing

Each 26 foot tube was bent, by hand, with a 1 1/2 inch EMT hand bender.

The rails are 2 by 6, at the end of each 16 foot 2 by 6, they are lag bolted to a 4 by 4 post buried in the ground 4 feet.

Homemade, Movable, Steel

- How does it move?
- Sits on a 3 inch long 7/8 inch sucker rod.
- Drilled a hole through the wood and drove rod into the hole.
- Reduces friction and surface area




Homemade, Movable, Steel




- Crops grown
 - Potatoes
 - Zucchini
 - Cucumbers
 - Broccoli
 - Green Beans
 - Carrots
 - Beets
 - Turnips
 - Radishes
 - Sunflowers
 - Zinnias



Premade Steel



- 30 by 48 Stuppy's Powerhouse
- Bought on Craigslist
- Had to take down and rebuild
- Many other options for tunnels
- New this growing season

Type of Tunnels and Costs

Type of Building	Cost to Make	Approx. Growing Ft	Lifespan of Bldg	Production
PVC small & simple 12 by 20	\$200	240 sq. ft.	2-3 years	600 lb of tomatoes
PVC with sidewalls 18 by 42	\$650	756 sq. ft.	4-5 years ?	2,000-3,000 lbs of tomatoes
Homemade Steel and Movable 16 by 32	\$700	512 sq ft each crop / 1,536square feet per season	10 plus?	350 lbs of Zucchini 100 lb of Broccoli 100 lb of Beans 200 bunches of turnips 100's lb of carrots
Premade	\$2,500-\$4,000+	800 sq ft	10 plus	

Site Selection and Orientation

- Close to your home
- Close to your fields and production areas
- North and South or East and West
- Irrigation Source
- Electricity



Site Selection and Orientation

- A Critical Detail for Maximizing Productivity
- Our Tunnels
 - Stationary: North/South facing
 - Movable: East/West facing
- Do your research:
 - At my latitude (39.3) either direction is acceptable.

North/South Site Selection and Orientation



- East side gets afternoon shade with tall crops
- Peppers on East side of tomatoes produced less than West side

East/West Building Site Selection and Orientation

- North side gets shaded with taller crops to the South
- Planted tallest plants in the North rows



Use of Space

- Intercropping within the bed
 - Lettuce, Radishes, Onions, Turnips
- Along the outside walls
 - Leeks, Cucumbers
- On the outside walls
 - Greens
- In the walkways
 - Seedlings, Planters
- Don't forget about the Vertical Space
 - Trellis
 - Hanging baskets/planters

Use of Space in Walkways



Use of Vertical Space

Use of Space on the SideWalls and intercropping

Crop Selection

- Select crops that
 - Grow well in your climate
 - Sell well in your markets
 - Are highly productive per square foot
 - Select anticipated crops as a loss leader to gain early customer loyalty until field crops come in

Good Choice: Tomatoes, Cucumbers, Peppers, Cut Flowers, Herbs, Spinach, Lettuce
 Poor Choices: Sweet Corn, Pumpkins, Okra

Crops We Grow in High Tunnels

Tomatoes, Cherry Tomatoes, Bell Peppers, Hot Peppers, Onions, Lettuce, Spinach, Turnips, Beets, Carrots, Radishes, Bok Choy, Napa Cabbage, Arugula, Tatsoi, Broccoli, Potatoes, Cucumbers, Pickling Cucumbers, Green Beans, Cut Sunflowers, Cut Zinnias, Ground Cherries, Green Onions (Scallions), Kale, Swiss Chard

Crop Selection

Planted March 28th

April 24th

June 13th

Cherokee Purple

Crop Selection: Tomatoes

Varieties: Big Beef, Cherokee Purple, Pineapple, Estiva, Florida 91, BHN 640, BHN 587, BHN 871, BHN 875, Lemon Boy

Crop Selection: Cherry Tomatoes



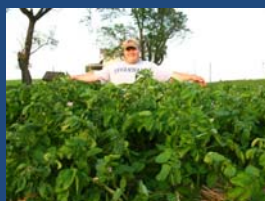
Varieties: Sweet Millions, Tomatoberry, Sweet Gold, Sungold, Black Cherry, Golden Sweet, Red Pearl, Red Pear, Yellow Pear, Isis Candy, Snow White, Tumbling Tom

Crop Selection: Bell Peppers



Varieties: Red Knight, Revolution, Lantern, Ace, Satsuma, Chocolate Beauty, Lafayette, Tequila, Purple Beauty, Blanca

Crop Selection



Varieties: Yukon Gold, Red Norland, Purple Majesty, Mountain Rose

Crop Selection



Cauliflower Varieties: Cassius, Graffiti, Cheddar, Veronica

Broccoli Varieties: Green Magic, Arcadia, Blue Wind

Carrot Varieties: Napoli, Mokum, Yaya, Amarillio (yellow)

Crop Selection



Turnip Varieties: Haikuri

Spinach Varieties: Space, Tye

Radish Varieties: Pink Beauty, White Ping Pong, Cherry Belle, French Breakfast

Lettuce Varieties: Red Sails, Oakleaf, Jericho, Winter Density, Black-Seeded Simpson, Rouge, D'Hiver

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