

Diggin' Tunnels: Low, Quick, & Caterpillar Tunnels for Season Extension

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Season Extension

- Locally grown
- Market demand
- Expanding selection
- Early and late season

Low Tunnels



Use

- Starting early plants
- Helps germinate or protect young transplants

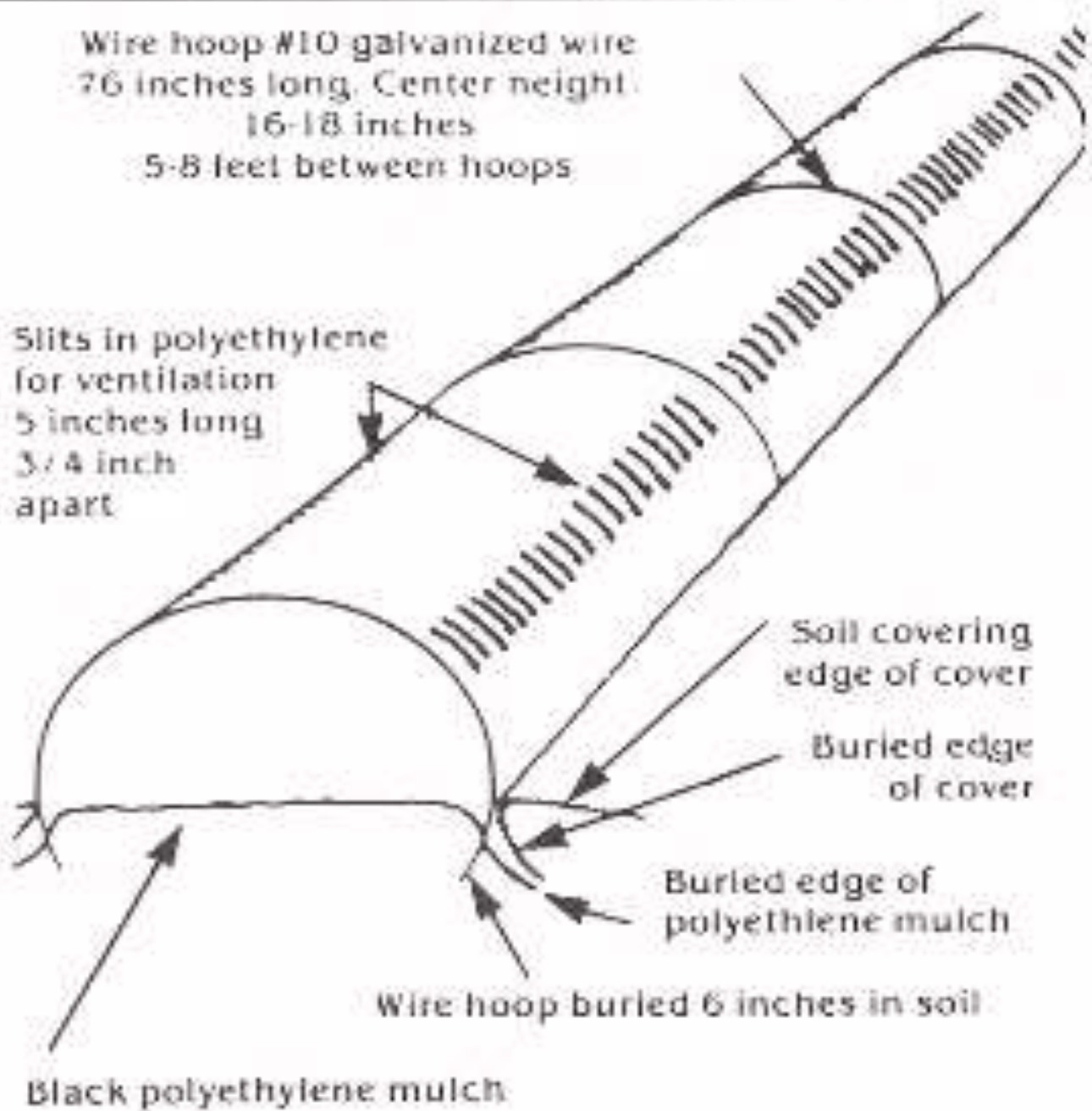


Benefits

- Easy to put up
- Relatively inexpensive
- Can cover many rows quickly
- Heavier protection with poly
- Partial ventilation with slotted poly
- Fabric row cover
- Reuse of materials

Wire hoop #10 galvanized wire
76 inches long, Center height
16-18 inches
5-8 feet between hoops

Slits in polyethylene
for ventilation
5 inches long
3/4 inch
apart



Soil covering
edge of cover

Buried edge
of cover

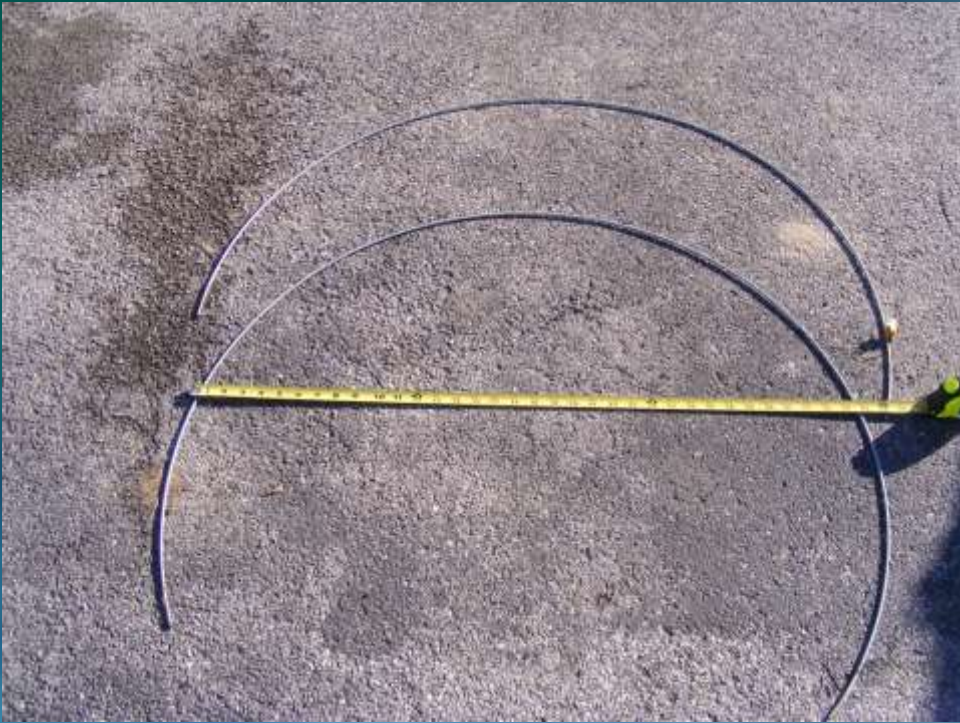
Buried edge of
polyethylene mulch

Wire hoop buried 6 inches in soil

Black polyethylene mulch

Wire Hoops

Two sizes
22"x36"
32"x36"



Can Stretch Out



Practices

- Can use fabric row cover for some frost protection
- Row cover offers ventilation when sunny
- Good for early greens
- Can protect against some insect pests

Practices...

- Can cover with greenhouse poly for extra protection for more tender crops
- Use vented poly (slotted or perforated) that gives excess heat relief
- Good for more heat-loving crops like tomatoes, eggplant, peppers, summer squash & zucchini
- Can transplant out on black plastic & raised beds

Slits or Slots



Perforated



Drawbacks

- Need to bury edges of covers
- If not buried then weighed down
- Unpredictable weather conditions
- Tall plants don't fit well
- Need irrigation especially with poly covering

Costs

- Average costs based on 250ft section
- 3ft bed = 750sqft or at 4ft = 1000sqft
- Row cover (ex. Agribon 19) 83"x250' = \$50
- Clear poly 6'x1000' $\$85/4 = \21.25
- Wire hoops 100/bundle \$80
- Wire hoops space 5' wide 51x\$0.80 = \$41
- Plus set up time/labor + irrigation costs
- Materials alone = \$113/250ft of row/bed
- Costs approx. \$0.15 sqft + labor

Quick Tunnels





Benefits

- Spring or fall/winter use
- Larger size for larger plants (straight sides)
- Can cover existing rows/beds for fall
- More air volume
- Provides extra protection with multiple covers
- Can hold certain crops overwinter
- Move locations for rotations
- Less expensive than high tunnels
- QTs can be an educational step towards HTs

Tunnels in Snow



Practices

- Larger space to build up heat
- Use with row cover for light frost protection and to add extra heat for pushing crops in the fall
- Protect late plantings & extend harvests (ex. peppers, broccoli, cauliflower, determinate tomatoes)
- Plant specific crops for late protected harvests (sprouting broccoli, lettuce, Asian greens, spinach etc.)

Hoop Set Up



Practices

- Hoops need to bend to fit bed width
- Keep in mind width of covers available
- Wind direction
- Set up before you have to
- Fertility
- Planning for harvest starts with planting
- Fall harvest, late fall, overwinter
- Insufficient sunlight

Materials

- Electrical conduit EMT $\frac{1}{2}$ " or $\frac{3}{4}$ " x 10ft
- Stakes
- String (mason's twine #9 braided)
- Broom handle or long handle pry bar, 2lb hammer
- Shovel, hoe, or mattock
- Sand bags
- Tape measure, ruler
- Marker

Using Hoop Bender



Set Up...

- Have to deal with wind
- Have hoops sunk at least 12" deep
- Hoops space 5-6' apart
- Stake & string for straight lines
- Tie hoops together for support
- Trench side with prevailing wind
- Sand bags each side tied together
- Leave enough fabric or plastic at ends
- Add poly at same time as fabric cover

Setting Up Hoops



68" post hole digging bar



Holding It All Together



Drawbacks

- Time & labor to set up and take down
- Harder to work in the winter
- Cover can freeze to the ground
- Need to ventilate on warm sunny days – time consuming to do it

Costs

- ½" x 10ft emt conduit \$2 spaced @ 5' - 21 lengths x \$2 = \$42 (100ft)
- ¾" x 10ft emt conduit \$4 2 end hoops = \$8
- Bender 4' \$60
- Fabric cover (ex. Agribon 19) 10' x 250' \$72 (\$29)
- Greenhouse film 10' x 100' \$75
- Sand bags \$27/100 – need 40 = \$12
- Mason-type twine \$5
- For a 100ft tunnel (bender cost +) \$163
- Approx. cost @ \$0.50 sqft + labor

Open & Shut Case



Caterpillar Tunnels



Benefits

- Can work inside
- For high value crops
- More room to work
- Longer season for use
- More air volume for heat

Roomy



Practices

- Set up for high value crops
- Prepare fertility earlier
- Soil preparation and weed management
- Irrigation
- Pest management
- Adding secondary covering for cold protection (LT)

Set Up

- Hoop size dependent on width of greenhouse poly
- Poly wider than width of structure
- Chain link fence piping (1 3/8") in 20ft lengths
- Connecting emt conduit (up to 1 1/4") x10ft
- Larger diameter tubing gives heavier support
- Connect hoops together with piping or rope
- Strong couplers for emt
- 4-5ft hoop spacing

Setting Up a Cheap Frame



Couplers



Soft Metal vs. Steel



Support



Smaller Diameter Hoop Support



Drawbacks

- Build from scratch
- Larger diameter hoops harder to bend
- Width of tunnel dependent on height
- Wind
- Snow loads
- Dimensionally restricted by greenhouse film widths
- Adequate ventilation during warm spells
- More time & labor to take-down & move

Costs (approx 9-10ft x 90ft)

- Depends on diameter of conduit for hoops
- EMT ½" x 10ft - \$2 ¾" x 10ft - \$4 1¼" - \$9.50
- Chain link fence top rails 1⅜" x 21ft - \$35
- Greenhouse film 20ft x 110ft \$275+
- Rebar 3ft lengths \$2.70 (for smaller dia. pipe)
- Couplers from < \$1- \$4 ea (for 2 – 10ft pipes)
- Rope (400-600ft) \$50-60) galv. #9 wire \$60
- 2x3x96" studs for support \$45
- Approx total cost \$490-\$1100 + labor
- \$0.54 to \$1.22 sq ft. (28x96ft HT > \$2.70 sqft)

More Information

- Cornell Vegetable Program Team
<http://cvp.cce.cornell.edu/>
- Instruction Manual for the 9377 & 9520
Quick Hoops Benders Web Site:
www.johnnyseeds.com

Resources and Supplies

- E & R Seed LLC 1356 E. 200 S. Monroe, IN 46772 866-510-3337 leave a message and they'll get back to you (Amish operation) supply company with great selection of parts and accessories for tunnels as well as farm supplies. eandrseed@yahoo.com
- Sauder's Produce Supplies 2511 Welker Rd. Penn Yan, NY 14527 315-536-2160 (Adam Sauder – Amish operation)
- Fairview Fencing (source of chain link fence pipes 21ft lengths and supplies). 1692 County Line Rd. Lyndonville, NY 716-765-1127, 585-735-3090
- A.& M. Leonard Horticultural Supplies www.amleo.com
- Building supply operations like Lowe's or Home Depot for metal conduit, line, hardware.

