



Economical Climate Control for Extended Production in High Tunnel Vertical Growing Systems North East SARE Farmer Grant—2009 (May 2010—Dec 2011)

Allen and Kathy Lilly

Owners and Operators—Ryan's Glade Farm and Garden

- over 10 years experience with fresh fruit and vegetable production
- have been cooperators on other SARE projects

Technical Advisors

Willie Lantz, Extension Educator, UME Garrett County

Harry Swartz, Owner, Five Aces Breeding

Objective of the Grant Project

Use solar and wind power to heat water which will be used to provide heat to strawberry plants in a vertical growing system in a high tunnel to extend the season.

Components of the System

- Two 1000 watt windmills will deliver 12volt electricity to water heater elements
- 1000 gallon insulated water tank will serve as the heat source
- Day Neutral Strawberries (Seascape, EVIE II, San Andreas, etc) were planted in vertical system in July of 2010.
 - Vertical System made of nylon 8" tubes that were filled with traditional potting soil mix (ProMix).
 - Tubes were twisted off to from 12-16" long sections. 5-6 sections per 6' tall vertical growing tube
 - 4-6 plants per section—20-30 plants per vertical tube
 - Also looked at horizontal tubes—3 plants per foot of bag—5 vertical rows
 - 2000 plants in a 20' X 48' space
 - A pvc water line was run up the center of the vertical columns of strawberries \ which delivers the heated water from the tank.
 - Plants covered with a floating row cover when cold weather comes. (below 35F)

Challenges

- Ventilating the system in the early spring
- Controlling powdery mildew
- Even watering and feeding

Advantages

- Easier harvesting
- High Quality Fruit (high percentage)
- Off Season—High Dollar Market (\$3.00 per pint)

Results:

- 2010—less than .1 pounds per plant (Sept to November)
- Plants overwintered successfully with floating row covers
- 2011—.25 pounds per plant—500 pounds (May to November)
 - .5 pounds per square foot (\$2.25 per square foot)
- Cost of system ~ \$1.00 per plant
 - ? Not sure the life span of the nylon tubes
 - ? Carrying over the plants for 2012

Other System Features

Water collection with rain gutter on the high tunnel.

- .6 gallon water per 1" rain
- 20'X72' High Tunnel = 1440 sqft X .6 = 884 gallon water

Solar Water Pump used to move water to tanks in higher locations

- low volume pump that requires limited power.

Solar Panel for other electrical functions such as inflation fan.

