

SEASON EXTENSION



Nahshon Bishop
Lincoln University Cooperative Extension
Small Farm Specialist
Southwest Region

WHAT WE ARE GOING TO DISCUSS

- × Having the Correct Mindset
- × Structures Used for Season Extension



THE CORRECT MINDSET

- ✗ As a vegetable grower:
 - + We can produce healthy and tasteful fruits and vegetables throughout the growing season
 - + Our purpose today, is discuss simple, low costs external inputs that will allow us to achieve the same results “on the back side of the calendar”

THE CORRECT MINDSET

- ✗ We can achieve this by picking select vegetables and root crops that are “cold hardy”
- ✗ You will not be able to produce tomatoes in February without external heat and supplemental light!



THE CORRECT MINDSET

- ✗ Three key Elements need to be present when approaching four season gardening:
 - + Cold-Hardy Vegetables
 - + Succession Planting
 - + Protected Cultivation



THE CORRECT MINDSET

✗ Cold Hardy Veggies:

- + These are simply vegetables that tolerate cold temperatures.
- + These vegetables often have lower light requirements than traditional warm season crops
- + We will discuss these vegetables in details later in the presentation

THE CORRECT MINDSET

✗ Succession Planting

- + This refers to sowing vegetables more than once during a season so that you can continually harvest throughout the winter
- + It helps if you begin to think about this time of year as the 'second spring'

THE CORRECT MINDSET

- ✗ Two types of plantings on this side of the calendar year:
 - + Winter Harvest Crops
 - + Overwinter Crops



THE CORRECT MINDSET

✗ Winter Harvest Crops

- + These are crops that are planted in late summer or early fall. Generally, these crops are planted in a protected structure that makes it more enjoyable to harvest.
- + The sowing time allows the plants to mature before the winter season arrives
- + Because of the cold temperatures and lack of light, these crops essentially “sit” in the soil until they are harvested

THE CORRECT MINDSET

✗ Overwintered Crops

- + These are crops planed outside
- + Generally, these crops are planted in late fall or early winter
- + Their purpose, to provide a very early spring harvest
- + This ensures fresh produce on a year round basis for the grower

THE CORRECT MINDSET

- ✗ Planting Dates are important in the fall!!
 - + If you miss the planting date of a crop in the spring... not going to hurt you
 - + If you do not sow vegetables at the correct time in the fall, you might not harvest that particular crop!

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1 Sunrise: 7:09am Sunset: 5:00pm Day length: 9h 51m	2 Sunrise: 7:10am Sunset: 5:00pm Day length: 9h 50m	3 Sunrise: 7:11am Sunset: 5:00pm Day length: 9h 49m	4 Sunrise: 7:12am Sunset: 5:00pm Day length: 9h 48m	5 Sunrise: 7:13am Sunset: 5:00pm Day length: 9h 47m	6 Sunrise: 7:14am Sunset: 5:00pm Full Moon: 6:28am Day length: 9h 46m
7 Sunrise: 7:14am Sunset: 5:00pm Day length: 9h 45m	8 Sunrise: 7:15am Sunset: 5:00pm Day length: 9h 44m	9 Sunrise: 7:16am Sunset: 5:00pm Day length: 9h 44m	10 Sunrise: 7:17am Sunset: 5:00pm Day length: 9h 43m	11 Sunrise: 7:18am Sunset: 5:00pm Day length: 9h 42m	12 Sunrise: 7:18am Sunset: 5:00pm Day length: 9h 42m	13 Sunrise: 7:19am Sunset: 5:00pm Day length: 9h 41m
14 Sunrise: 7:20am Sunset: 5:01pm Last Qtr: 6:52am Day length: 9h 41m	15 Sunrise: 7:20am Sunset: 5:01pm Day length: 9h 40m	16 Sunrise: 7:21am Sunset: 5:01pm Day length: 9h 40m	17 Sunrise: 7:22am Sunset: 5:01pm Day length: 9h 40m	18 Sunrise: 7:22am Sunset: 5:02pm Day length: 9h 39m	19 Sunrise: 7:23am Sunset: 5:02pm Day length: 9h 39m	20 Sunrise: 7:24am Sunset: 5:03pm Day length: 9h 39m
21 Sunrise: 7:24am Sunset: 5:03pm New Moon: 7:37pm Day length: 9h 39m	22 Sunrise: 7:25am Sunset: 5:04pm Day length: 9h 39m	23 Sunrise: 7:25am Sunset: 5:04pm Day length: 9h 39m	24 Sunrise: 7:26am Sunset: 5:05pm Day length: 9h 39m	25 Sunrise: 7:26am Sunset: 5:05pm Day length: 9h 39m	26 Sunrise: 7:26am Sunset: 5:06pm Day length: 9h 39m	27 Sunrise: 7:27am Sunset: 5:06pm Day length: 9h 40m
28 Sunrise: 7:27am Sunset: 5:07pm First Qtr: 12:33pm Day length: 9h 40m	29 Sunrise: 7:27am Sunset: 5:08pm Day length: 9h 40m	30 Sunrise: 7:28am Sunset: 5:08pm Day length: 9h 41m	31 Sunrise: 7:28am Sunset: 5:09pm Day length: 9h 41m			

THE CORRECT MINDSET

✗ Protected Cultivation:

- + This refers to vegetables growing under cover
- + Traditionally, winter vegetables can survive outdoors under a blanket of snow
- + You cannot depend on snow
- + Honestly, who wants to work in the snow?

**Thanks
Polar
Vortex!!**



WHAT WE ARE GOING TO DISCUSS

- × ~~Having the Correct Mindset~~
- × Structures Used for Season Extension

STRUCTURES USED FOR SEASON EXTENSION

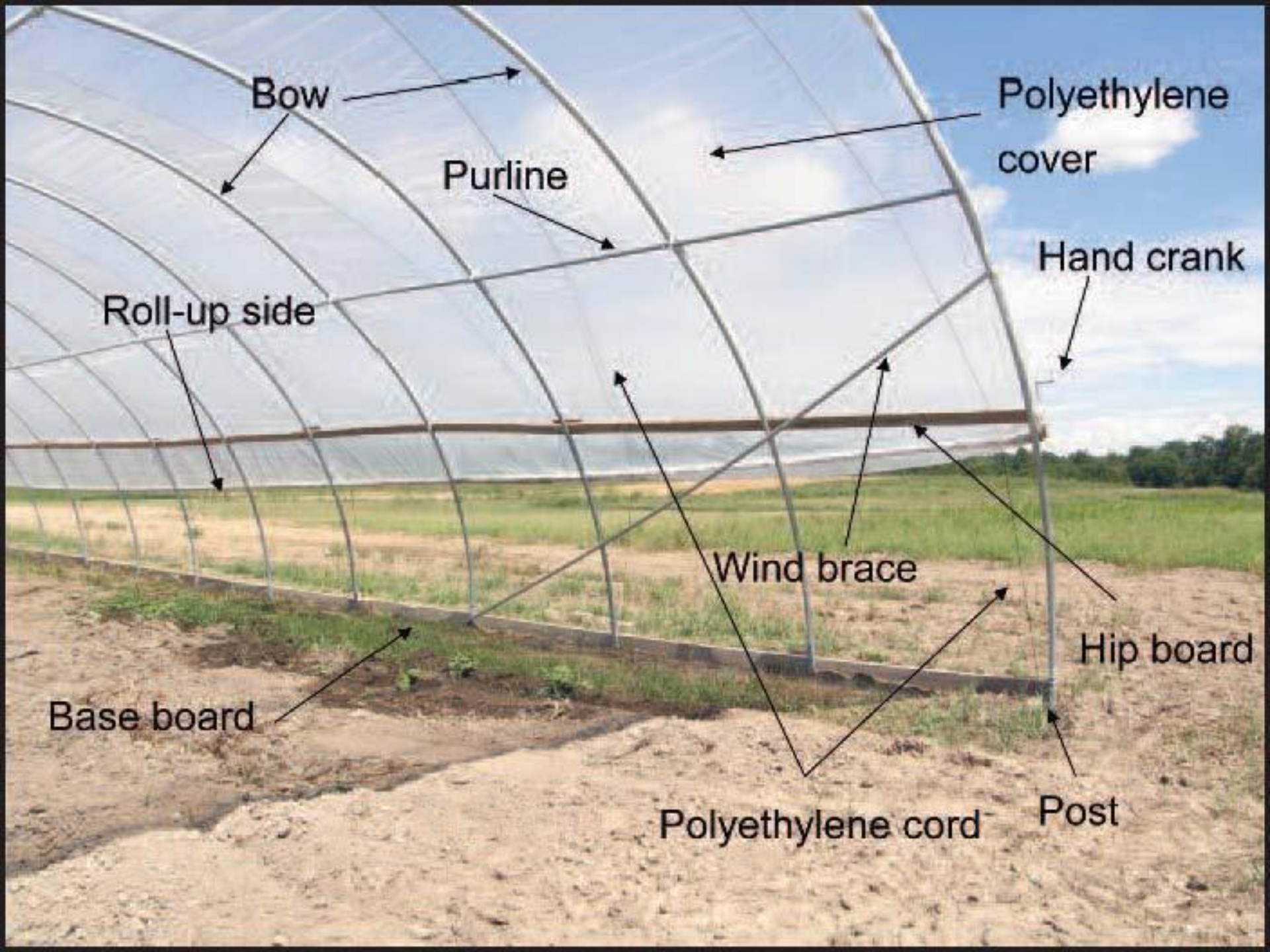
✕ Season Extension

- + Having an area covered by a sheet or sheets of plastic will produce a warmer environment that is easier for the owner to harvest and work in.
- + This will keep plants “growing” longer and allow an individual to transplant or direct seeder earlier in the spring

STRUCTURES USED FOR SEASON EXTENSION

× High Tunnels

- + A structure used to produce edible goods that is un-heated
- + You can have power to the structure
- + We have several individuals who have supplemental heating to produce certain crops



Bow

Polyethylene cover

Purline

Hand crank

Roll-up side

Wind brace

Hip board

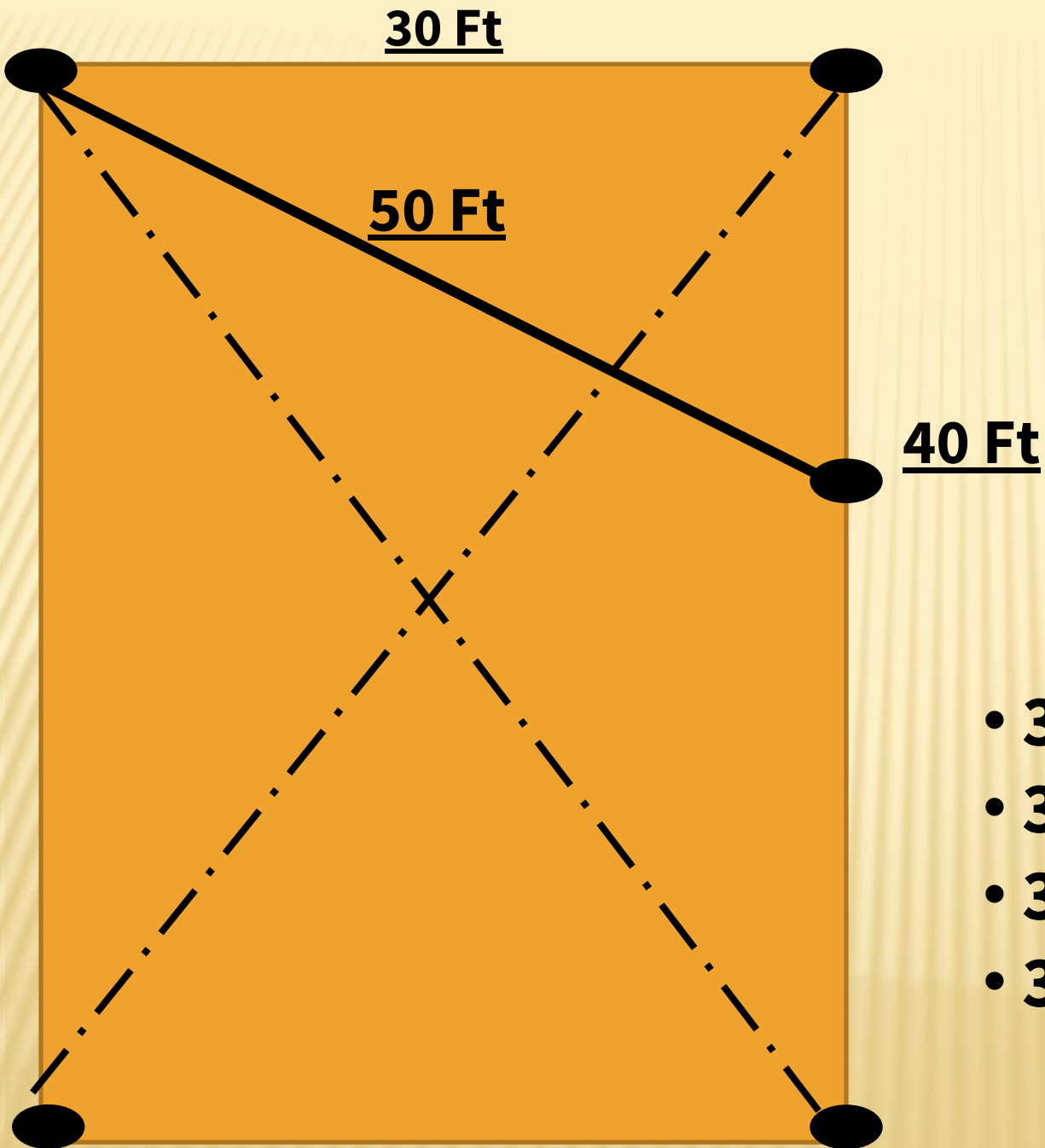
Base board

Polyethylene cord

Post

WHEN YOU FINALLY GET THE HIGH TUNNEL!



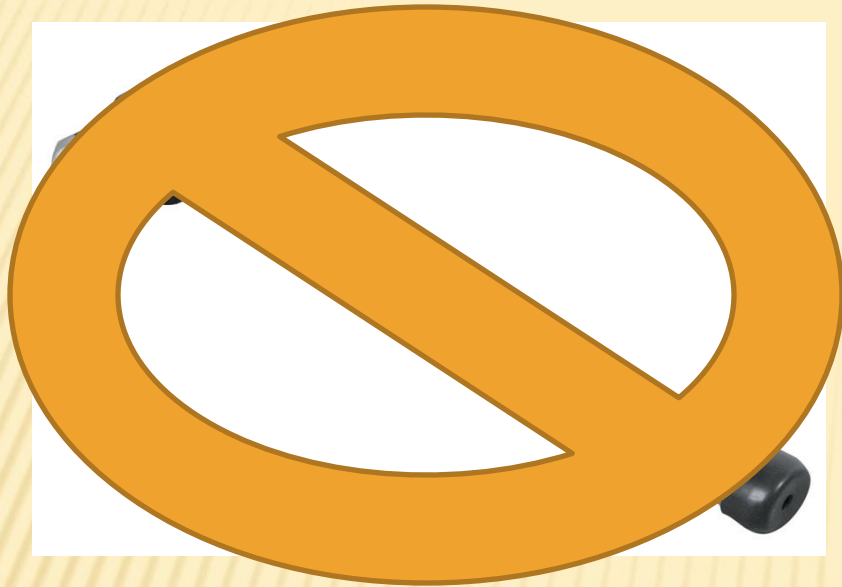


3,4,5 Rule

- **30x45= 54.08**
- **30x60= 67.08**
- **30x72= 78**
- **30x96= 100.58**







HIGH TUNNELS



Go Juice





HIGH TUNNELS



HIGH TUNNELS





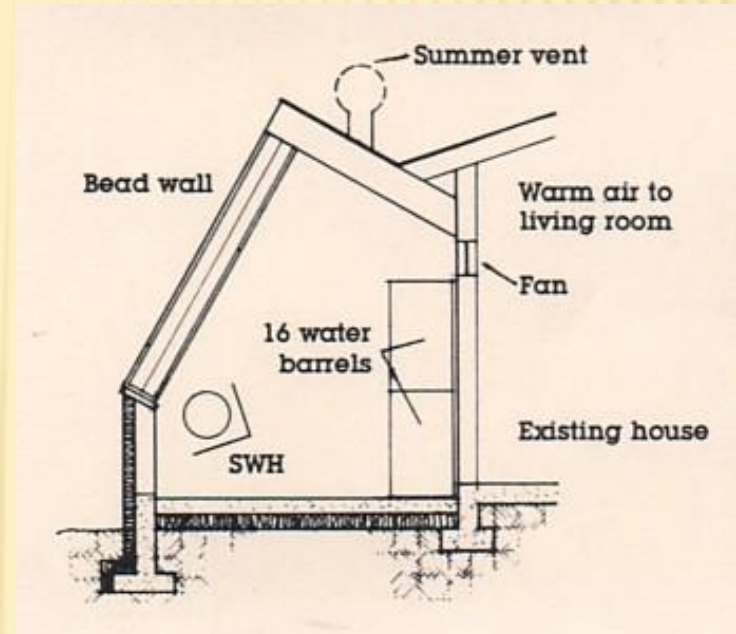
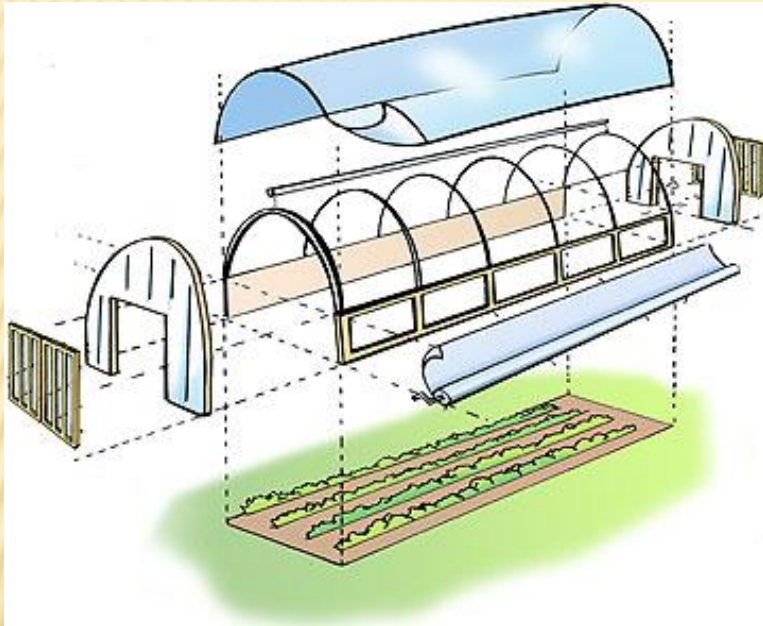
HIGH TUNNELS

- × Know what you are going to grow
- × “W” vs. “V” vs. “Standard Truss”
- × Length
- × Orientation
- × Talk to others in your area!

MOVEABLE HIGH TUNNELS



OTHER STRUCTURES USED FOR SEASON EXTENSION



LOW TUNNEL/CATERPILLAR













SEASON EXTENSION STRUCTURES AND COSTS

- ✗ Zimmerman- 30x96 between \$9-\$10,000
 - + Roughly \$3.58 per square foot
- ✗ Caterpillar Tunnels
 - + Roughly \$0.90 per square foot
 - + Locally sourced materials
 - + Need a bender

STRUCTURES USED FOR SEASON EXTENSION

✗ Row Cover

- + The general term “row cover” refers to spun bonded fabrics made out of polypropylene or polyester.
- + The lightest of these can be loosely laid on top of plants to help with pest pressure or protect young transplants
- + The heavier row covers offer additional benefits by adding as much as 8 degrees to the ambient air beneath the cover itself (where your plants are).

MATERIALS USED FOR SEASON EXTENSION

✗ Floating Row Cover



MATERIALS USED FOR SEASON EXTENSION



STRUCTURES USED FOR SEASON EXTENSION





MATERIALS USED FOR SEASON EXTENSION

✗ Row Covers

- + There are row covers made out of plastic
- + These covers are generally split down the sides to allow air exchange
- + Careful management is needed when using this type of row cover
- + Temperatures can quickly reach 20-30F higher than the surrounding air!

POPULAR VEGETABLES THAT ARE COLD TOLERANT

Leafy Greens:	Vegetables:	Flowers:
× Arugula	Beet	Calendula
× Chard	Bok Choi	Linaria
× Cilantro	Broccoli	Pansy
× Collards	Cabbage	Johnny jump-up
× Cornsalad	Carrot	
× Cress	Kale	
× Dandelion	Leek	
× Endive	Onion	
× Escarole	Pak choi	
× Lettuce	Pea	
× Mizuna		
× Mustard		
× Purslane		
× Spinach		

POPULAR VEGETABLES THAT ARE COLD TOLERANT

✕ Carrots

- + Carrots actually taste “sweet” when harvested in the winter time
- + Sugars are actually released within the plant to avoid cellular destruction in cold weather



POPULAR VEGETABLES THAT ARE COLD TOLERANT

✕ Spinach

- + Wonderful to enjoy on its own, or in a salad mix
- + This crop is a cut-and-come-again plant
- + Will survive a big portion of the winter months (if not all winter)!



POPULAR VEGETABLES THAT ARE COLD TOLERANT

✕ Leeks

- + A wonderful crop to spice up the mid-winter blues
- + You can either hill-up dirt on either side of the leek or bury the plant (if transplanted) deeper into the soil



POPULAR VEGETABLES THAT ARE COLD TOLERANT

✕ Radish

- + Something crisp to add to the salad
- + Will not put on new growth in freezing temperatures



RESOURCES

× Succession Planting Interval Charts

- + http://www.johnnyseeds.com/t-succession_planting_interval_chart_vegetables.aspx?source=SuccessionPlantingOverview_062013

Recommended Crops for Succession Planting

- + http://www.johnnyseeds.com/t-successionplanting.aspx?source=Webarticle_SucceSSIONPlantingMethods_052013_Guidelinestxt

× Finding day length Time for your area

- + <http://www.sunrisesunset.com/>

CONTACT INFO

× **Nahshon Bishop**

**Lincoln University Cooperative
Extension**

Small Farm Specialist

× **Phone: (417)846-3948**

× **Email: bishopn@lincolnu.edu**

WORKS CITED

- × "Websters Online Dictionary with Multilingual Online Thesaurus ." *Websters-Online-Dictionary* . Webster Dictionary , n.d. Web. 9 Feb 2012.
<http://www.websters-online-dictionary.org/definitions/THERMAL_STORAGE>.
- × Thomas, Andrew L. and Richard J. Crawford, Jr. 2001.
Performance of an energy-efficient, solar-heated greenhouse in southwest Missouri. Southwest Missouri Agricultural Research and Education Center 2001 Research Report. University of Missouri-Columbia.
- × Coleman, Eliot. *The Winter Harvest Handbook: Year-round Vegetable Production Using Deep-organic Techniques and Unheated Greenhouses.* White River Junction, Vt.: Chelsea Green Pub., 2009. Print.