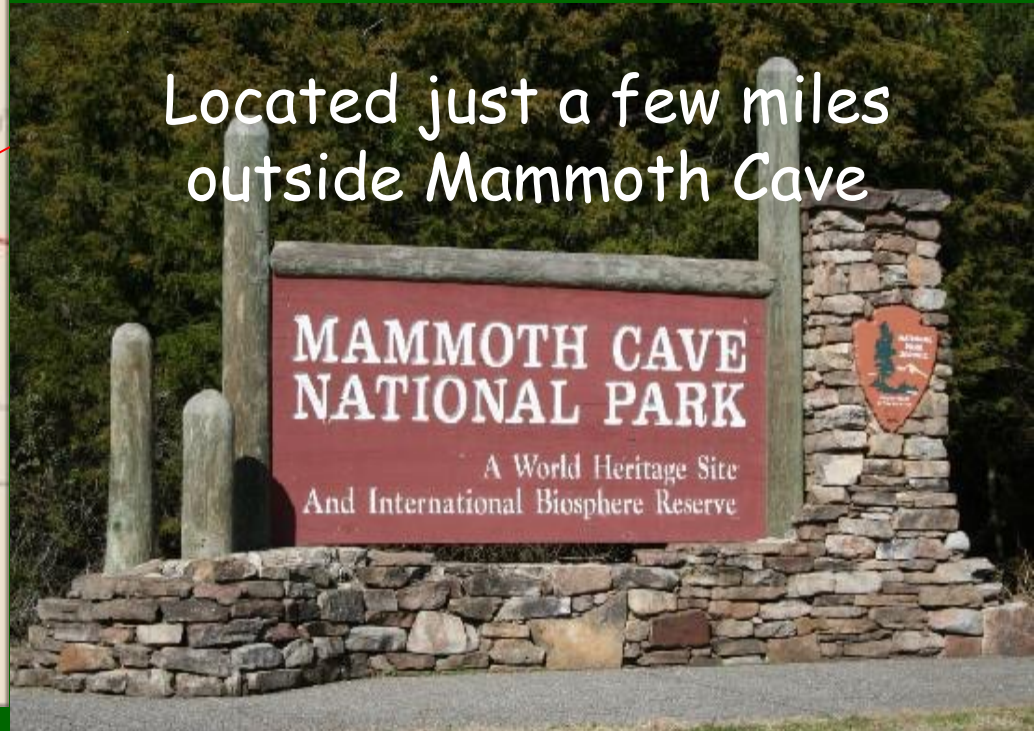


Paul Wiediger
Au Naturel Farm
was located in South
Central Kentucky.
Growing zone ~ 7a



Our farm

Located just a few miles
outside Mammoth Cave



Some things to consider if
you're just beginning
High Tunnel Production

Support Your Local
Organic Farmer



We started growing in a high tunnel
in 1995, added more as we went along
and grew in them for 20 years





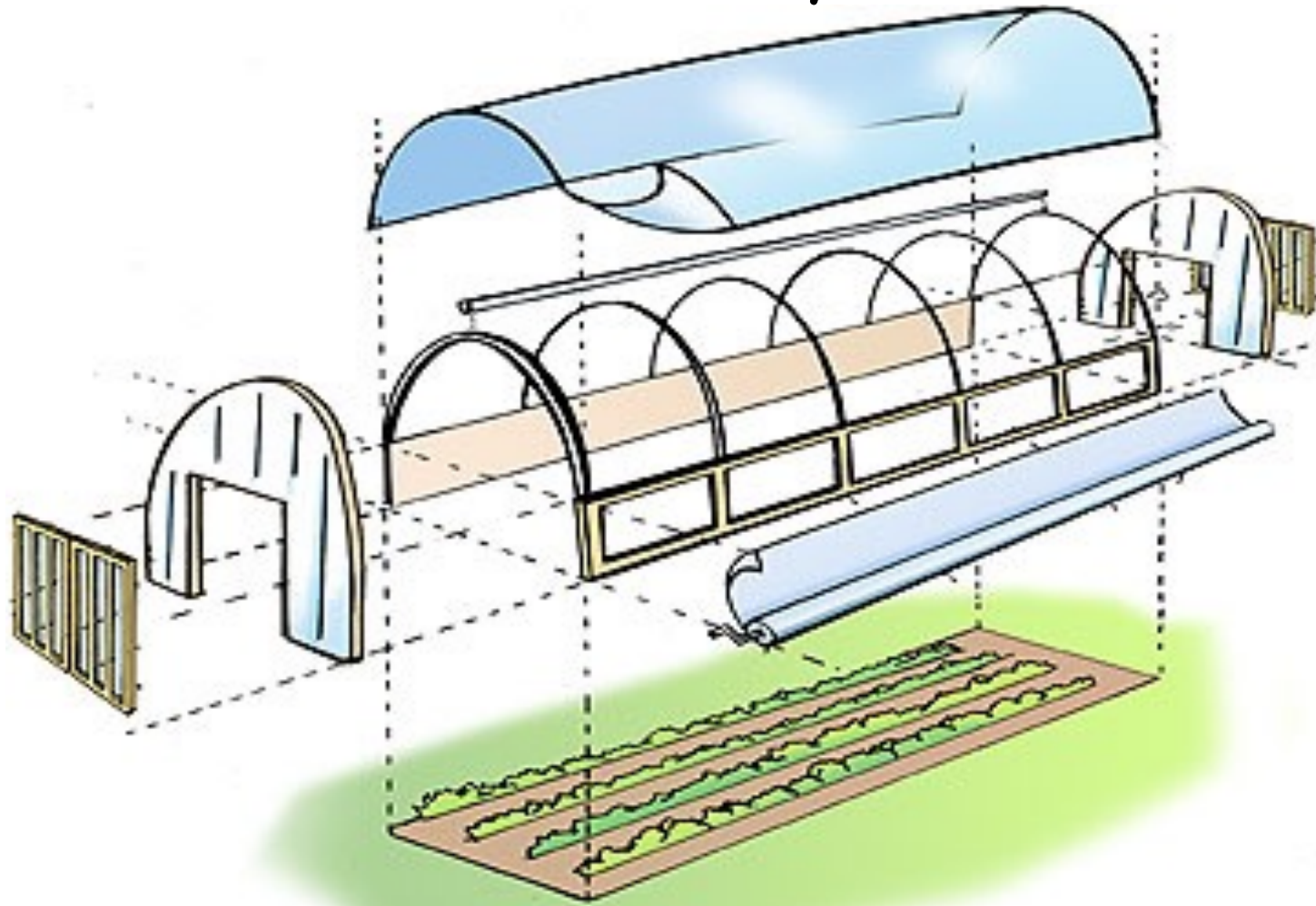
**I WANT YOU
TO TURN OFF
YOUR CELL PHONE**

Out of respect for others, please either turn your cell phone to vibrate or turn it off completely.

And if you need to take a call, please answer your phone out in the hall.

So let's get started!

What is a high tunnel
&
What do they do...

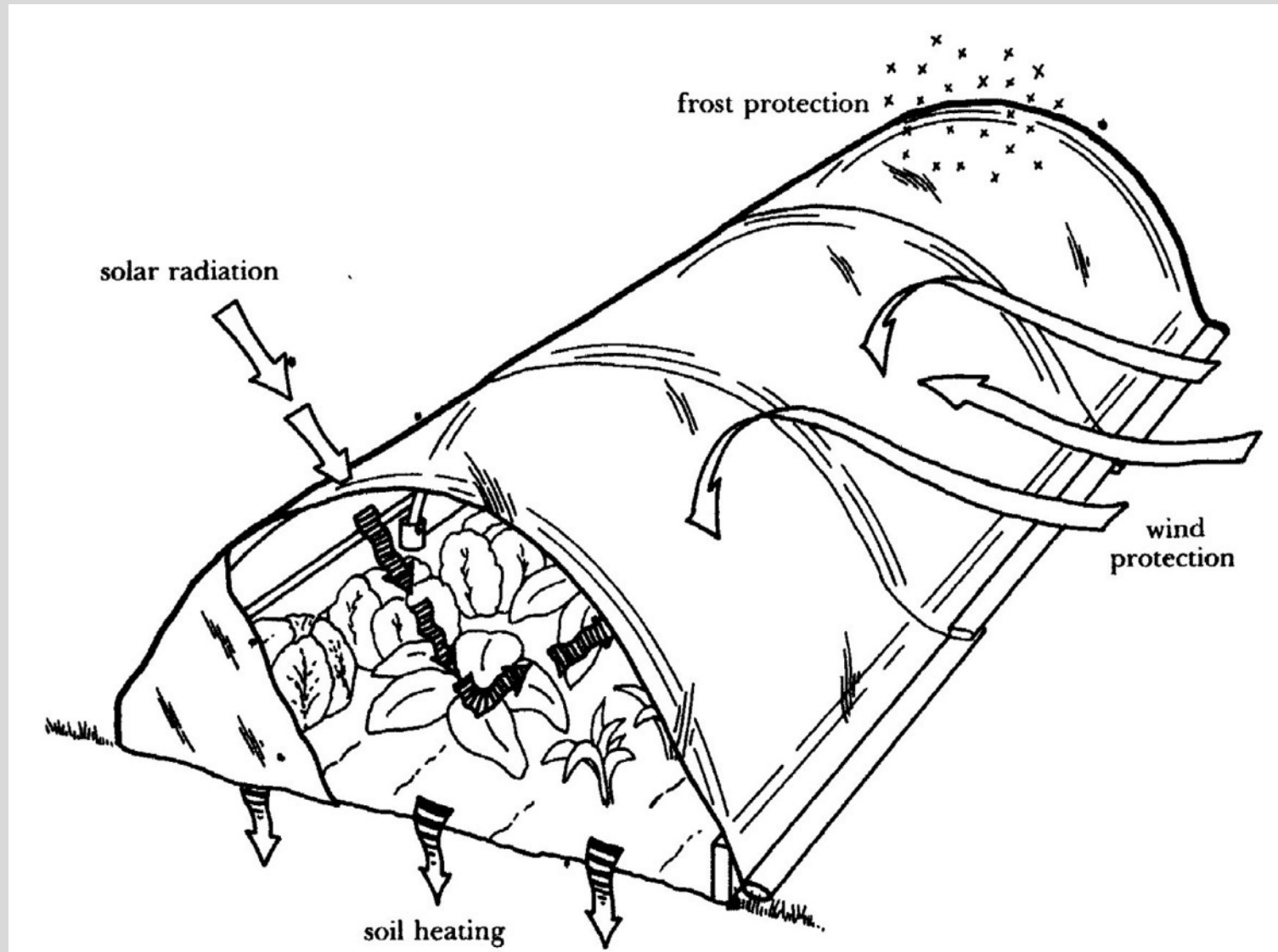


High Tunnels

- Keep out rain ~ act as an 'umbrella'
- Reduce wind
- Offer frost protection
- Trap heat ~ the soil acts as a solar heat sink, absorbing heat during the day and releasing it during the night



So your High Tunnel is creating its own
micro ecological niche or ecosystem





How can you make use of that micro ecological niche in your farm's marketing plan...

Photo:
L Jett WVU







Ginger



Or perhaps late fall potatoes. These were planted in early September and harvested in December.



Marketing ~ it's all about
Marketing!

Or

Don't plant a seed until you
know how you're going to sell
your produce!!!*

*Paul's first rule of profitable farming

Your marketing strategy will determine...

- What you are going to grow
- How much you are going to grow
- And when you are going to seed it



Good record keeping is **CRITICAL** if you are going to maximize your high tunnel production!

Some good information to record

What you are seeding or transplanting ~ variety

Seeding or transplant date

Planting rates ~ seeds/plants per foot or spacing

How many row feet or plants did you set out

First harvest date with yield

Other harvest dates and yields for cut and come again crops
or crops such as tomatoes, peppers, cucumbers, etc.

Last harvest date

Critical comments ~ did something occur that affected yield

Observations

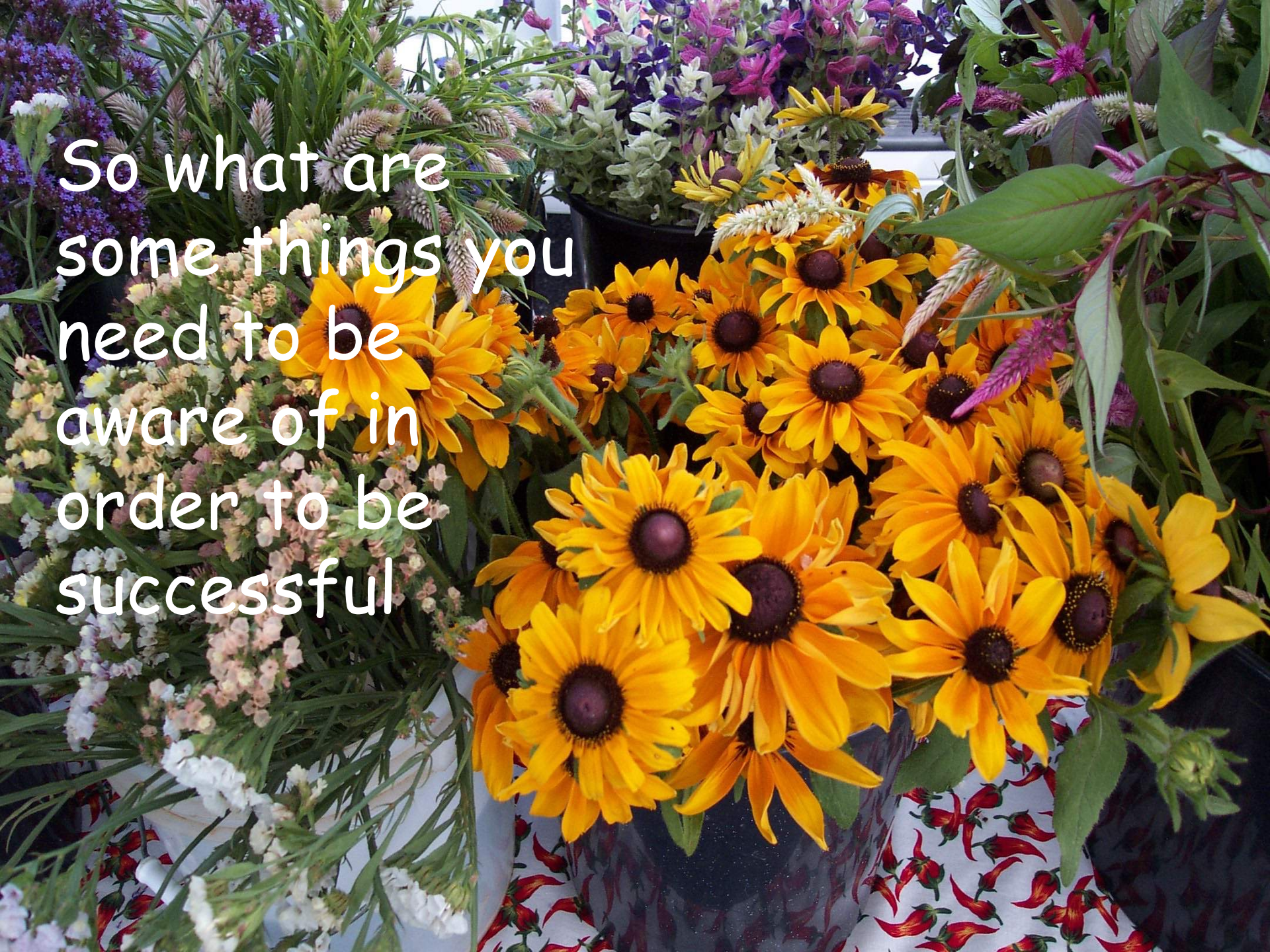
Assessments

Sales

Date: May 1, 2021

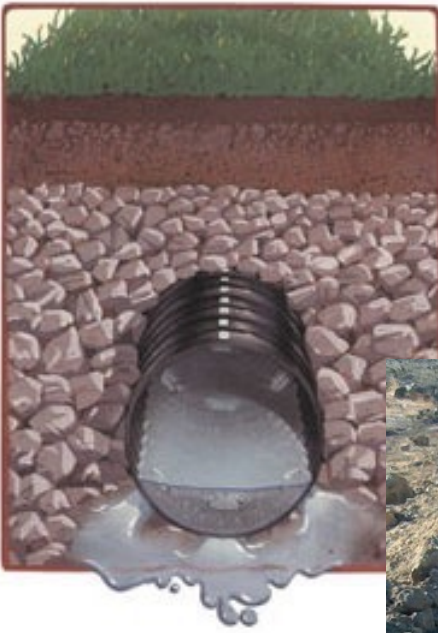
Items	load out	Unit	back in	sold
Vegetables				
Kale - Russian	18	Bunches	3	15
Kale - Curly	24	Bunches	6	18
Swiss Chard	15	Bunches	7	8
Collards	12	Bunches	2	10
Pak Choi	24	Heads	22	2
Tatsoi	12	Heads	9	3
Chinese Cabbage	8	Heads	2	6
Broccoli	46	Heads	Sold out 10:20	46
Carrots	65	Bunches	Sold out 9:40	65
Radishes	36	Bunches	Sold out	36
Salad Turnips	24	Bunches	2	22
Green Leaf Lettuce	12	Heads	2	10
Red Leaf lettuce	8	Heads	3	5
Green Romaine	24	Heads	Sold out 10 AM	24
Red Romaine	12	Heads	3	9
Buttercrunch	24	Heads	Sold out	24
Red Cross	18	Heads	Sold out	18
Green Oak	12	Heads	5	7
Red Oak	12	Heads	5	7

Market Comments: Good weather, great crowd




So what are
some things you
need to be
aware of in
order to be
successful

Drainage - a key consideration!



A 30 by 96 foot high tunnel will shed over
1725 gallons of water in a 1 inch rainfall.
So a 3 inch rainfall means you're dealing with almost
5200 gallons of water!



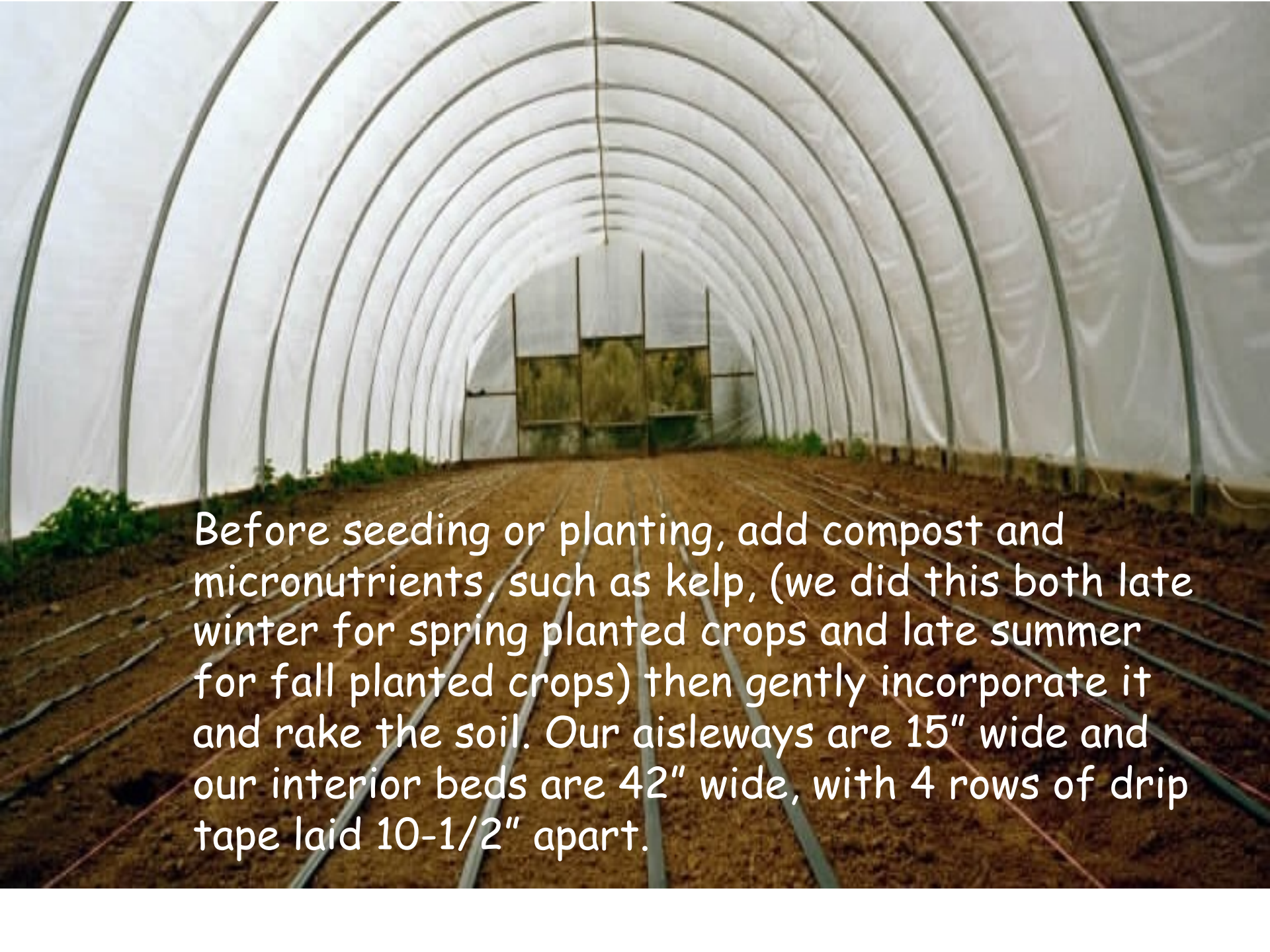
Maintaining Soil
fertility along with
organic matter in
order to grow
drop dead gorgeous,
delicious tasting,
nutrient dense crops,
season after season,
year after year
becomes a challenge!

Using plant based compost at the rate of about 2.5 to 5 cubic yards for a 30X96 foot high tunnel seems to bring good long term production results.

A basic recipe

- 1 part grass hay
- 1 part alfalfa hay
- 2 parts straw
- 2 parts wood shavings
- 2 parts leaves
- 1 part peat (optional)
- 1 part soil

Recipe from John Biernbaum, MSU

The image shows the interior of a large, arched greenhouse. The structure is made of a series of curved metal ribs covered with a white plastic or fabric material. The floor is covered with dark brown soil, which has been prepared into long, straight rows. There are several rows of soil beds, separated by narrow aisles. In the center of the greenhouse, there is a large, open doorway or entrance. The lighting is bright, suggesting natural light coming from the translucent covering. The overall impression is of a well-maintained and organized growing environment.

Before seeding or planting, add compost and micronutrients, such as kelp, (we did this both late winter for spring planted crops and late summer for fall planted crops) then gently incorporate it and rake the soil. Our aisleways are 15" wide and our interior beds are 42" wide, with 4 rows of drip tape laid 10-1/2" apart.

Water Management

Proper water management is critical for good seed germination and plant growth. After seeding, we water the seed in with a wand, then turn on the drip irrigation system, letting it run to get the bed wet enough so that it doesn't dry out for at least 48 to 72 hours. This ensures excellent seed germination. After seed has germinated, we only use drip and water every few days as soil condition dictates.



Note filter

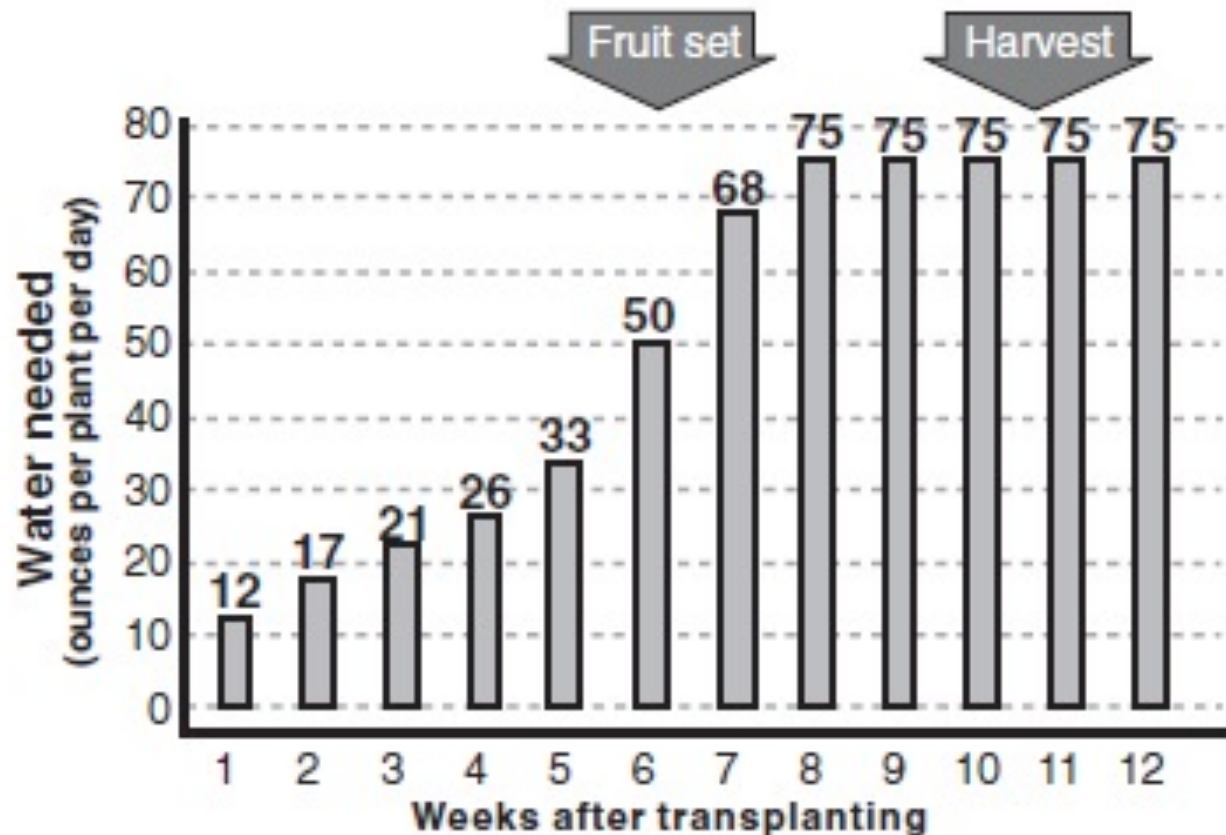


Figure 1. Water requirements of high tunnel tomatoes.

Watering and Fertilizing Tomatoes in a High Tunnel

Lewis W. Jett, Division of Plant Sciences
University of Missouri

Drip Irrigation

A photograph showing a drip irrigation system installed in a field. Several black plastic tubes, which serve as the mainlines, run parallel to each other across the brown, tilled soil. A thin red string is visible on the ground, likely used as a guide for the layout. In the background, a metal structure, possibly a greenhouse or a fence, is partially visible. The text "Drip Irrigation" is overlaid in white on the upper left portion of the image.

Easy way to Transplant



Ventilation



Next on our list is
dealing with weeds.

That's Red Root Pigweed,
only 3 to 4 inches tall and
trying to set seed at the
end of November.

And we have become aware
of one of the vague laws of
high tunnel production that
says "High Tunnels create
their own vacuum, sucking in
any weed that has gone to
seed on your farm!"



At this stage, weeds are easy to handle



Unchecked, they can look like this..



A photograph of a vegetable garden. In the foreground, there are rows of young green lettuce plants. Behind them, the soil is brown and tilled. Three tools are standing upright in the soil: two square-headed shovels with wooden handles and one flat-topped tool, possibly a hoe or a specialized shovel. A curved-handled tool, likely a trowel or a small shovel, lies on the ground to the left. Black plastic mulch is visible in the background, with small green seedlings spaced out along the rows. The text "Scale appropriate tools" is overlaid on the right side of the image.

Scale
appropriate
tools

11/25/02



Effective weed control measures

- Never allow any weeds to mature and set seed
- Keep weeds and grasses from maturing and setting seed around the outside of your high tunnel
- Use weed barriers (mulches) when practical
- Utilize strategies that eliminate or reduce the amount of cultivation needed to keep the crop weed free, such as flaming or solarization
- Before weeds become a problem, make the time to cultivate when they are young, or better yet, before they even emerge

Insects



IPM Scouting Chart for 20 X 96 Hoophouse

Each # is a scouting location ST is a sticky trap

Window		Door		Window	
Bed	Aisle	Bed	Aisle	Bed	Aisle
			1		3
	16			2	
15					
	14				
		ST	ST	4	
13					5
		ST	ST	6	
	12				
11					7
	10	9		8	
Window		Window		Window	

Early **detection** through scouting, **recording** your observations, then accurate **identification** along with **having a plan** how you're going to deal with the problem are 4 key components to an effective program!



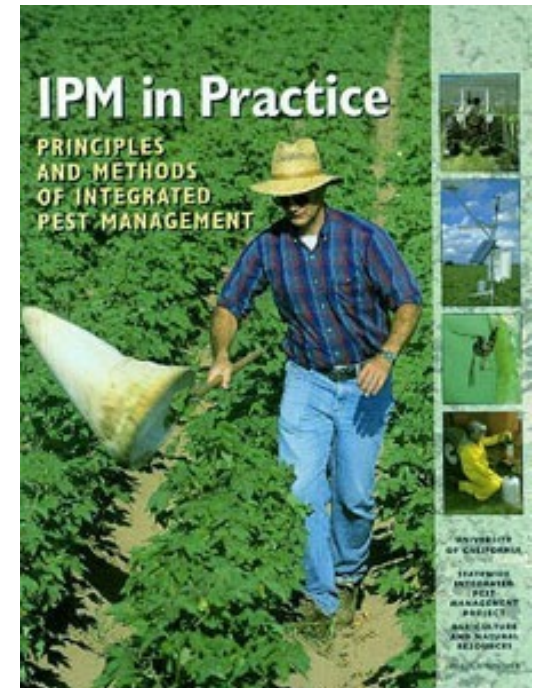
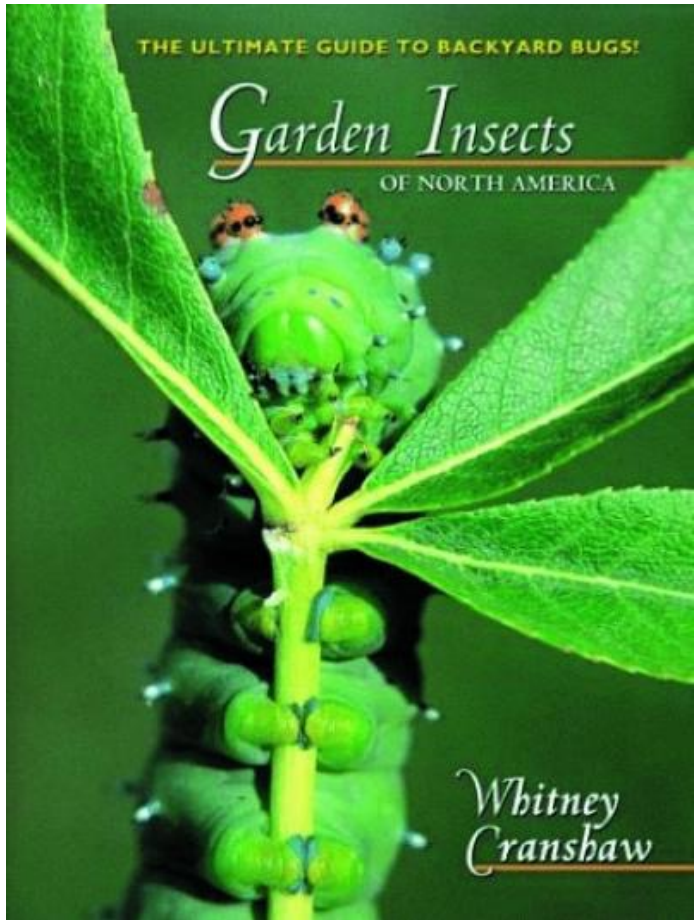
Sticky Yellow Trap

Scouting

- Establish a routine
- Carry a hand lens (10X or greater)
- Look at 3 or more plants per location
 - Record your observations
 - Are the number of insects increasing or decreasing?
 - Is foliage damage increasing?
- Establish a number of insects per plant as a threshold for corrective action
- Take pictures of insects and plant damage

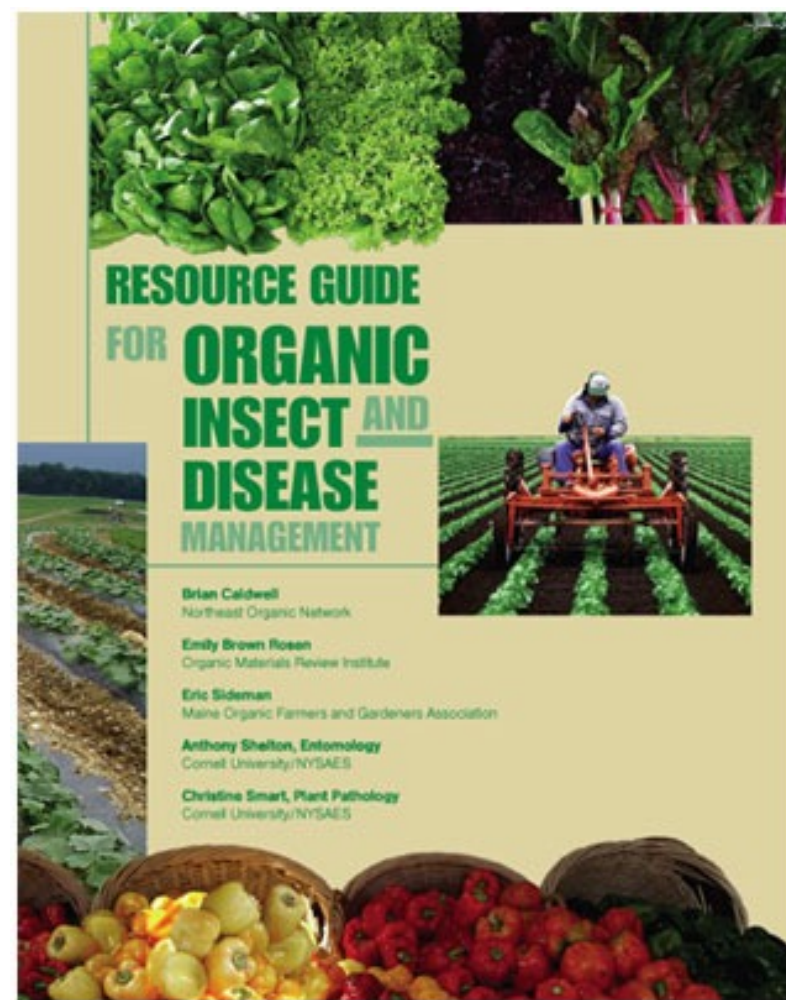
Resources

Or, if you don't know what you're looking at, how will you ever know what to do about it!?!



ATTRA ecological
pest management

Cornell Universities
Resource Guide for
Organic Insect & Disease
Management
&
Growing Small Farms
NC Cooperative Ext



Growing Small Farms

CHATHAM COUNTY CENTER
NORTH CAROLINA COOPERATIVE EXTENSION

Promoting awareness, understanding, and practice of sustainable agriculture

Lures and traps



Aphids on tomatoes



Aphids can devastate a winter greens crop



Yellowing Virus transmitted
by Aphids on a spinach crop



So, why are aphids such a problem & why do they like my high tunnel?!

- Aphids reproduce parthenogenetically. They are almost all females, and here in the South, they give live birth to more females and newborns can reproduce in as little as 7 days! These newborns can reproduce 5 per day for 30 days!
- Dense plantings provide plenty of food & cover, as well as 'hot spots' of greater humidity and higher temperatures
- Poly covering excludes rainfall, so insects aren't disturbed by rain droplets and we don't have the insect diseases that are promoted by moisture.
- Aphids reproduce at lower temperatures than predators
- Parasitoids can cause a worse problem on leafy greens

Best chance at Aphid control

- Early detection through scouting - NO ET
- Trap crops (they seem to like kale & mustard!)
- Remove infested vegetation (lower leaves)
- Insecticidal soap spray (underside of leaves)
- Neem based products
- Aphid Parasites*
- Lady Beetle release*
- Lacewings release*

*effective only if
done in warm weather!

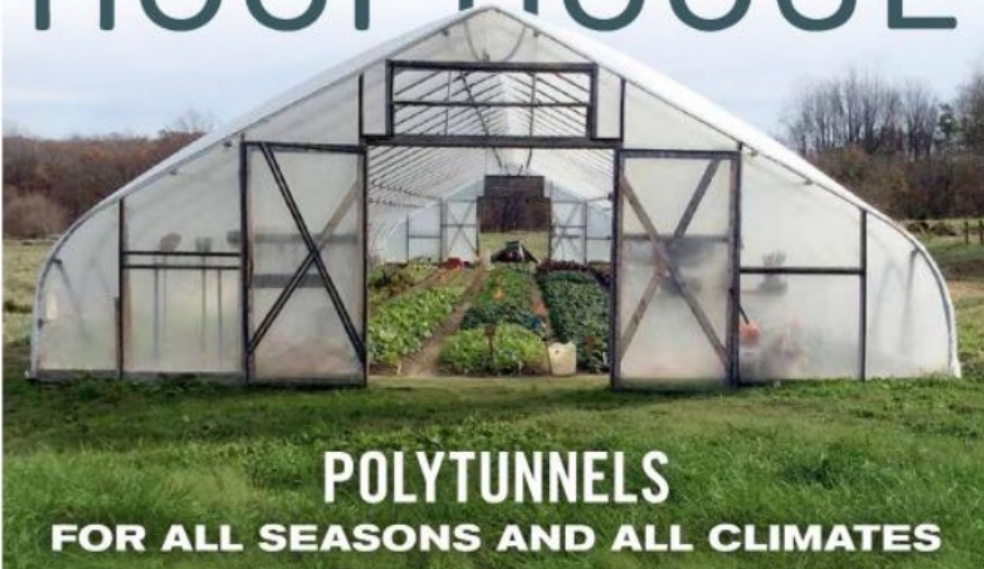
The worst thing you
can do is ignore
them!



PAM DAWLING



THE YEAR-ROUND HOOPHOUSE



POLYTUNNELS

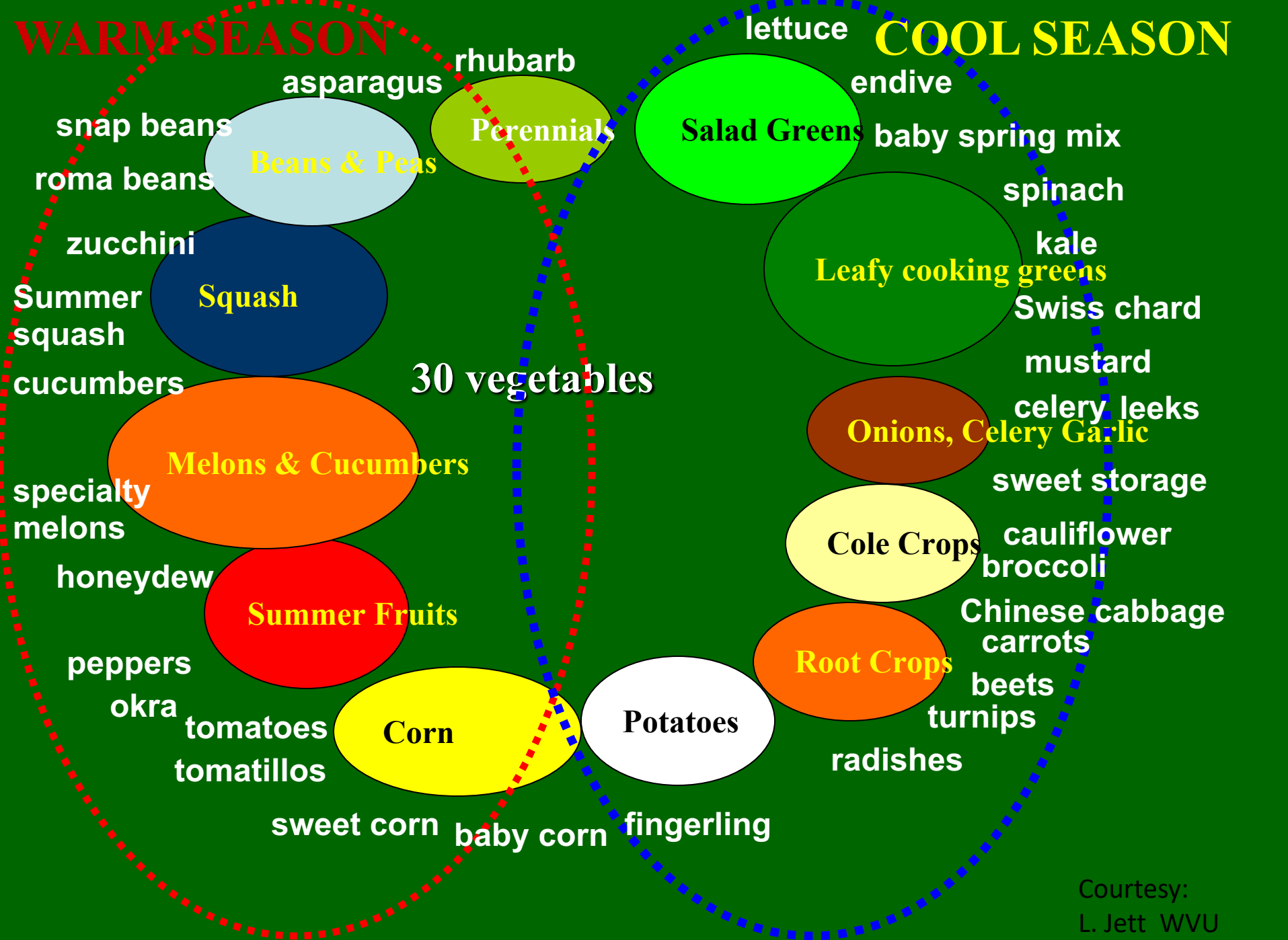
FOR ALL SEASONS AND ALL CLIMATES

Additional Resources

Lots of GREAT
websites
and

I highly recommend
this book.

The author farmed in
Virginia.



Courtesy:
L. Jett WVU

Thank you
and
good growing!

