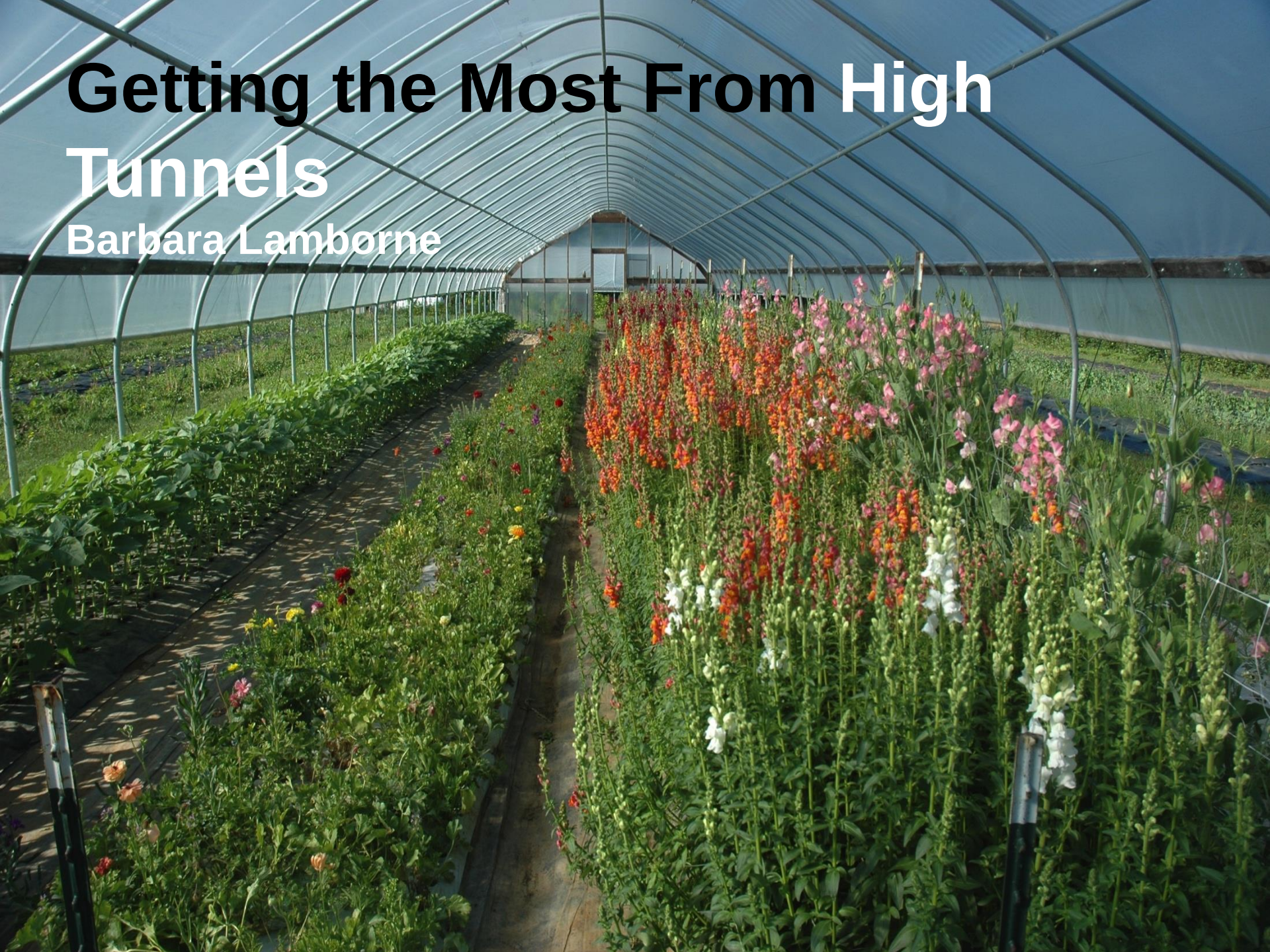
Getting the Most From High Tunnels

Barbara Lamborne



A lot to cover

- Tunnel vs. Field Production
- Types of Tunnels
- Siting and Construction
- Soil and Bed Preparation
- Crop Planning and Planting Schedule
- Tunnel Maintenance and Management

Why Tunnel vs. Field

Cool weather crops can start early

Ranunculus

Poppy

Cool weather crops can start early

Stock

Sweet peas

Plants grow taller

Lisianthus

Tunnel is the only way

Chrysanthemum

Tunnels temper the weather factor

Campanula

Delphinium

Some crops handle cold and heat

Lisianthus

Force tulips earlier than in field

Types of Tunnels

Simple, homemade structure

Specialized Structure

Insect screened for Dahlia protection from Northern Corn Root worm

Recycled, repurposed materials

Reused swimming pool cover

Quonset style

Large heat store; sheds snow poorly

Gothic style

Extra heat removal

Ridge vent for ventilation

Siting a tunnel

Level ground and pad is best

Downhill, uniform pitch works

Other siting considerations

- Condition of soil
- Amount of sun
- At least 20 foot open perimeter for access
- Source of water and electricity
- Have a plan for future tunnels

Work the soil before you start

- Consider what equipment will fit after your tunnel is built
- Use large machines before you build

Think about wind

- Good for ventilation and cooling
- Too much is bad

Group your tunnels

Tunnel Construction

Save your marriage – hire a crew

…An experienced crew

Fill gaps under baseboard

Choose end-wall doors intentionally

36” wide Home Depot

48” wide custom polycarbonate

Simple, 2x4 homemade

Homemade wood frame

-

Plumbing pipe keeps doors shut!

Options for rolling up curtains

Homemade t-bar

Gear crank

Insulating with double layer poly

- 3-6 degrees warmer at night
- Less condensation drip
- Greater protection from wind abrasion

Soil and Bed Preparation

Know/love your soil

Test every year

Date: February 2, 2016
Samples: 4
Page: 1
Report Number: 15-345-0201

10955 Blackhawk Drive • Blue Mounds, WI 53517
(608) 437-4994 • FAX (608) 437-4441

Soil Analysis Report

from Midwest Laboratories
13611 B St Omaha, NE 68144
(402) 334-7770

Submitted by:
ELLEN POLISHUK

PREPARED FOR: GREENSTONE FIELDS

Sample ID	Analysis Date	Organic Matter %	Cation Exchange Capacity CEC meq/100g	Percent Base Saturation (Computed)					Soil pH	Potassium	Magnesium	Calcium	Sodium	Phosphorus			Sulfur	Micronutrients					Surf NO3-N ppm
				% K (+)	% Mg (+)	% Ca (+)	% H (+)	% Na (+)		K (+) ppm	Mg (+) ppm	Ca (+) ppm	Na (+) ppm	P_1 (WEAK BRAY 1:7) (-) ppm	P_2 (STRONG BRAY 1:7) (-) ppm	Bicarb (Olsen) (-) ppm	S (ICAP) (-) ppm	Zn (+) ppm	Mn (+) ppm	Fe (+) ppm	Cu (+) ppm	B (-) ppm	
BOB 15	12-15-15	5.4	13.3	2.5	16.4	80.1		1.0	7.2	128	261	2138	31	31	114	-	30	5.3	15	37	2.8	1.2	10
Desired Level				3-5	12-16	70-75			6.8	156-259	192-255	1862-1995		25-50	50-100	33	50	5.0	20	20	5.0	2.0	
DAVE 15	12-15-15	4.3	10.9	2.3	14.0	82.4		1.3	7.1	97	183	1790	33	44	154	-	84	8.2	10	30	3.4	2.4	21
Desired Level				3-5	12-16	70-75			6.8	128-213	157-209	1526-1635		25-50	50-100	33	50	5.0	20	20	5.0	2.0	
JIM 15	12-15-15	5.3	12.7	1.8	18.4	78.2		1.6	7.0	90	280	1985	48	82	132	-	115	13.8	11	48	6.4	3.0	34
Desired Level				3-5	12-16	70-75			6.8	149-248	183-244	1778-1905		25-50	50-100	33	50	5.0	20	20	5.0	2.0	
BAB 215	12-15-15	4.7	15.9	2.6	11.8	85.0		0.6	7.7	163	226	2697	22	53	134	44	16	5.3	10	35	3.0	1.3	5
Desired Level				3-5	12-16	70-75			6.8	186-310	229-305	2226-2385		25-50	50-100	33	50	5.0	20	20	5.0	2.0	

Some soil basics

- You create a special soil microclimate that may be great… or not
- Ideal pH is 6.5 – 7.2
- Manure based compost increases phosphorous…how much is too much?
- Salts (Sodium and Sulfur) can, and should be, rinsed out

Build organic matter without excess of nutrients

Flush the soil

- Goal of 1 inch of water per day for 14 days

Tunnels need to get naked

Have a plan before you build

Bed preparation

Broad forking and tilling

Soil supplements

- Spent lily medium
- Compost
- Nutrients

Bed preparation

Covering beds

- Photo of the header line

Walking rows don’t make money

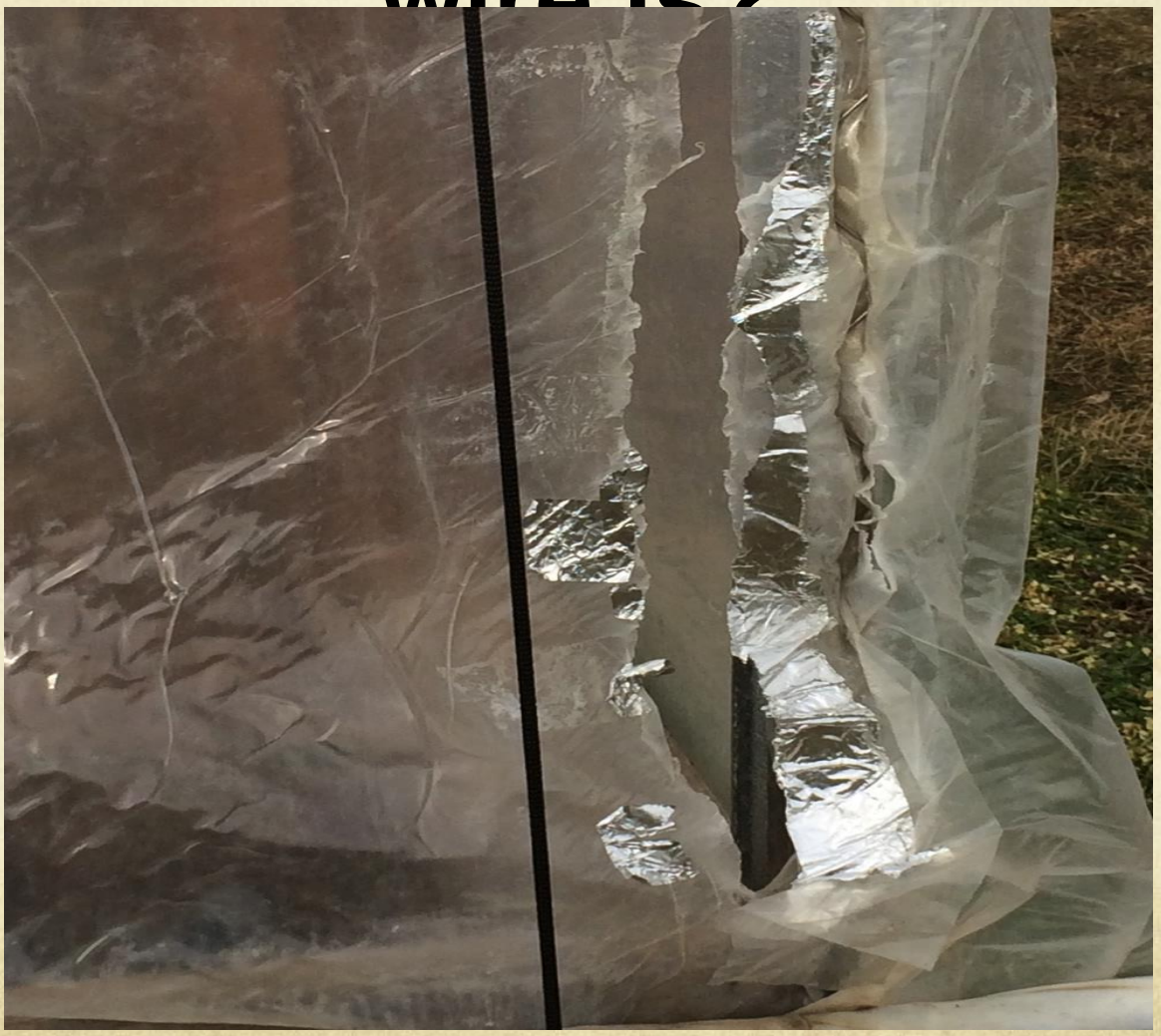
Make the most of that space

Maintenance and Management

Daily chores

- AM and PM temperature control
- Watching for condensation
- Catch the afternoon solar gain
- Use doors, curtains and fans

It’s time to open the tunnel, do you know where your wiggle wire is?



Wind control

Or not…

SNOW = DILIGENCE!!!

The old way

The smart way

Right tools, and…….great neighbors

Brace center perlin

Sleeping through the night

Tuck things in when cold

Summer heat

- Fans help ventilate
- Can take plastic off of end walls

Cut in the morning

Keep things tidy – avoid disease

Rubbermaid

Critters – good, bad and ugly

Insect monitoring

Feeding

Nutra-Live Vitality™
Transplant Solution
Nutra-Live Growth™
ORGANIC
Neptune's
Harvest
FISH & SEAWEED FERTILIZER
2-3-1
Bio-Coat Gold™

Fertigator

Crop Planning and Planting Schedule

Planting schedule

- Learn what to plant, and when, for early spring production

Points about planting schedule

- Careful planning to ensure maximum use of space
- 6x6 gives you 114 plants per 10 feet
- 9x9 gives you 48 plants per 10 feet
- Lisianthus @ 6x6+1 are 19/foot
- Try to fit a cover crop between
- Consider what you will overwinter
- Plan for naked time if possible

Fall planted dianthus

Consider permanent residents

Specialize

In Closing

- You have invested heavily in a new environment; treat it with respect.
- Know your soil and keep it happy.
- Manage temperature – Don't fry your plants!
- Condensation and reduced circulation lead to wet soil, witch fosters disease.
- BUT DON'T UNDER WATER YOUR BABIES!!!!
- BUT DON'T OVER WATER YOUR BABIES!!!

Have a plan

Green
STONE
FIELDS