

Fall & Winter Production in high tunnels at Au Naturel Farm



Interest in
healthy,
local food is
sweeping
across our
nation!

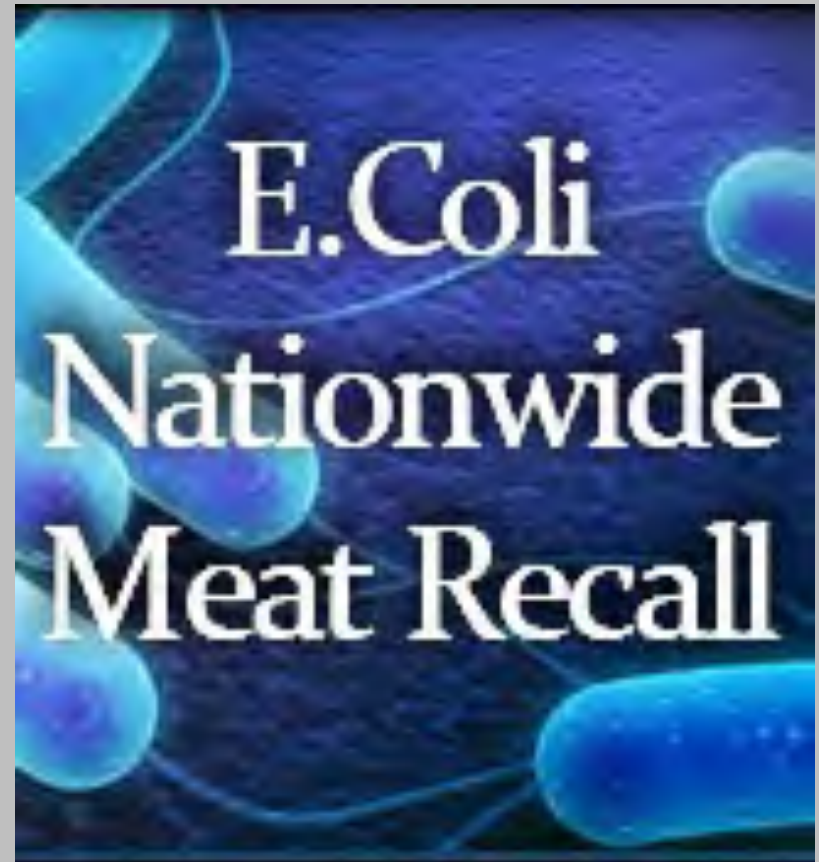


Driven in part by concerns for childhood obesity

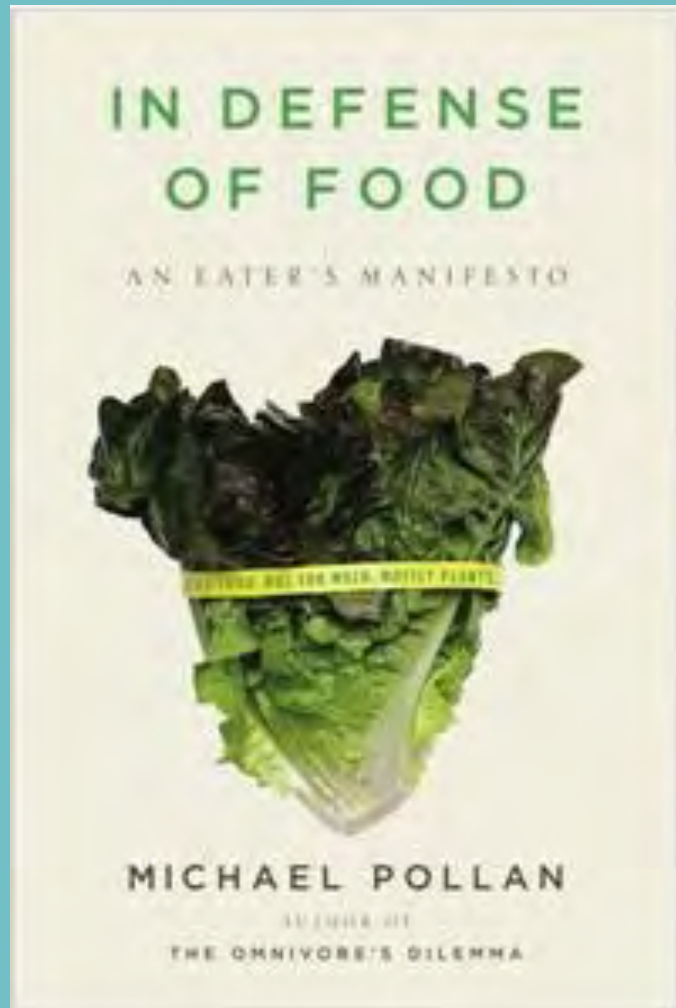


And an ever increasing distrust of our nation's food supply chain.

There have been 3 recalls involving produce since December 2021!!



And heralded by such champions as:

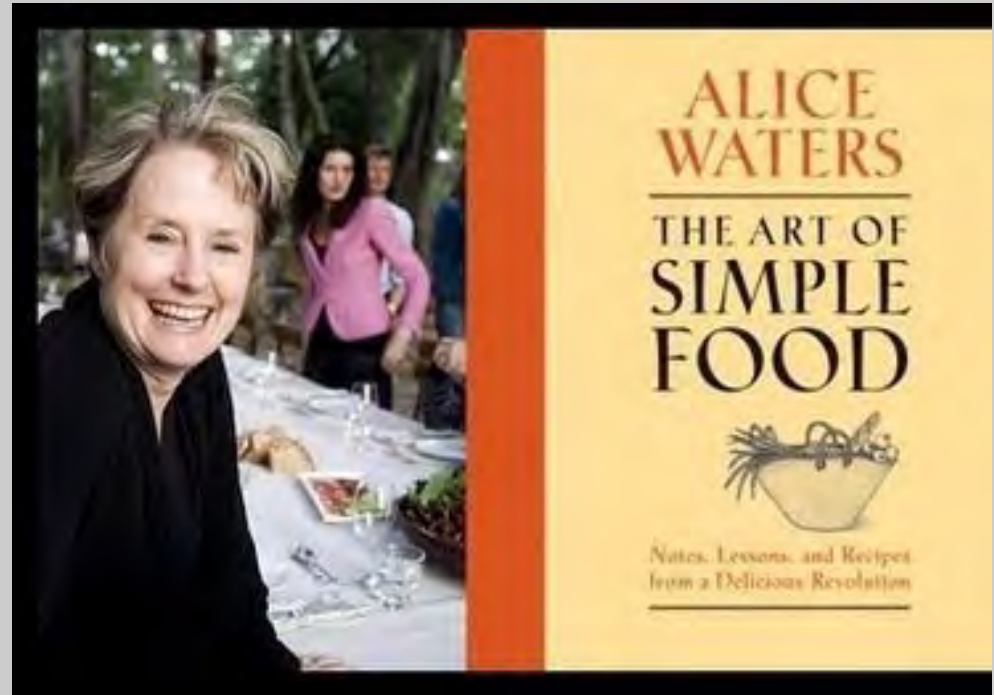


ANIMAL, VEGETABLE, MIRACLE

A YEAR of FOOD LIFE

BARBARA
KINGSOLVER

with STEVEN L. HOPP and CAMILLE KINGSOLVER



"It's a delicious
revolution!"

Culminating in the
creation of a new
consumer!



The Locavore Way

Discover and Enjoy
the Pleasures of *Locally* Grown Food

AMY COTLER




Herbivores eat plants.
Carnivores eat meat.
Locavores eat local.



High Tunnels

provide growers with a great opportunity to grow year round, including right through the winter! You'll discover that growing in them is not only productive, but totally joyful!



The image shows the interior of a high tunnel, a type of agricultural structure used for growing crops. The structure is covered with a translucent plastic material, supported by a series of curved metal ribs. Inside, there are several long, straight rows of young, green plants growing in the soil. The plants appear to be small seedlings, possibly for vegetables or fruits. The lighting is bright, suggesting a sunny day outside. The overall scene depicts a controlled growing environment for winter crops.

Ok, so just what do you have to do,
and what can you expect from winter
high tunnel growing?

Cool Season Crop Criteria

- Low light & Low temperature tolerance ~
September 1 - 12:55 December 1 - 9:55
December 21 - 9:44 February 7 - 10:39
- If it has to flower to set fruit, it might not work, and will probably not be profitable
- Plants need to tolerate freezing & thawing
- Look for crops that lend themselves to multiple harvesting ~ cut and come again

In order to grow during the winter, we have to back up.....like to June...

- Planning... lots of planning!

Really, it's more like planning, headache, Advil, planning, headache, more Advil...back to the drawing board, etc!!!

- Then, buying seeds

Then in Mid-August.....

- Seeding, seeding, followed by more seeding
- Adding Compost
- Preparing Beds
- Lots of irrigation



Then in Mid-September in the High Tunnels we are ...

- Seeding mesclun
- Seeding spinach
- Seeding beets, carrots, onions, radishes & turnips
- Planting potatoes
- Transplanting crops such as
 - Head lettuce
 - Collards, Kales, Swiss Chard
 - Pak Choi, Tatsoi, Chinese cabbage





Watering, lots of watering!!





Mesclun



Red Russian
Kale





Tatsoi

A large, dense patch of green Mizuna growing in a garden bed. The leaves are finely textured and bright green. A date stamp "11/25/02" is visible in the bottom left corner.

Mizuna



Purple Mizuna

Arugula





**Spicy Mustard
Greens – a blend
including
fancy cut green,
Golden Frills,
Ruby Streaks, & a
mottled or bicolor**

Mesclun

Spring & Fall

- 21 days seed to harvest
- multiple harvests every 5 to 7 days

Winter

- 28 to 35 days seed to harvest
- Multiple harvest every 14 to 21 days

Summer

- 17 days seed to harvest
- 1 cutting only



Other possible marketing ideas with Mesclun

- Lettuce only (we do this when flea beetle damage becomes severe). Some growers offer a lettuce mix with just a couple of lettuces, such as a green and red oakleaf.
- Salad mix - add a few greens such as Mizuna, Red Russian kale and Tatsoi to the lettuce mix.
- Spicy mix - add arugula and a red mustard, to the salad mix.
- Sell the greens without lettuce as a Braising Mix

SPINACH



Space

Tyee



Smooth leaf versus savoyed





Lettuce



Seedlings ready to
be set out.











Green Leaf





Kalura - a
fabulous green
Romaine that
really grows
well during the
low light and
cool
temperatures
of winter.

Seed SESE

Rouge d'Hiver
- a red
Romaine

Winter
Density - a
green
Romaine

Red Sails - a
red leaf





Butterheads

Nancy - a fabulous green

Red Cross - a beautiful red





Bibb
lettuce





Full production during the dead of winter!



Blessed with our climate, we are able to grow in our high tunnels all winter long. This picture was taken on December 30th and it shows both newly transplanted lettuce, and lettuce ready to harvest.



So now, maybe you're wondering
"What does happen when old man
winter shows up?"



Well here it is,
January 27, 2000
and the outside
temperature is a
cold 14 degrees!



And here is the front of one of our high tunnels.
You can see the ice crystals on the poly.



8:00 AM, and the inside temperature is about 22. As you can see, the young lettuce transplants as well as the kale look terrible.



This red oakleaf lettuce is also frozen.



The same
kale an hour
later, and the
temperature
has risen to
about 32
degrees.

The Oak Leaf
lettuce at
9:00, well on
its way to
recovery.





10:00 AM, 50 degrees, and mostly recovered.



Here's that
red oakleaf
lettuce at the
same time.



2:00 PM, 80 degrees and everything totally recovered.
And would you like to guess what the outside temperature is?



Would you believe that outside, it's still really cold - about 19 degrees. The heat gain from the sun, and the ability of the plants to recover always amazes us.

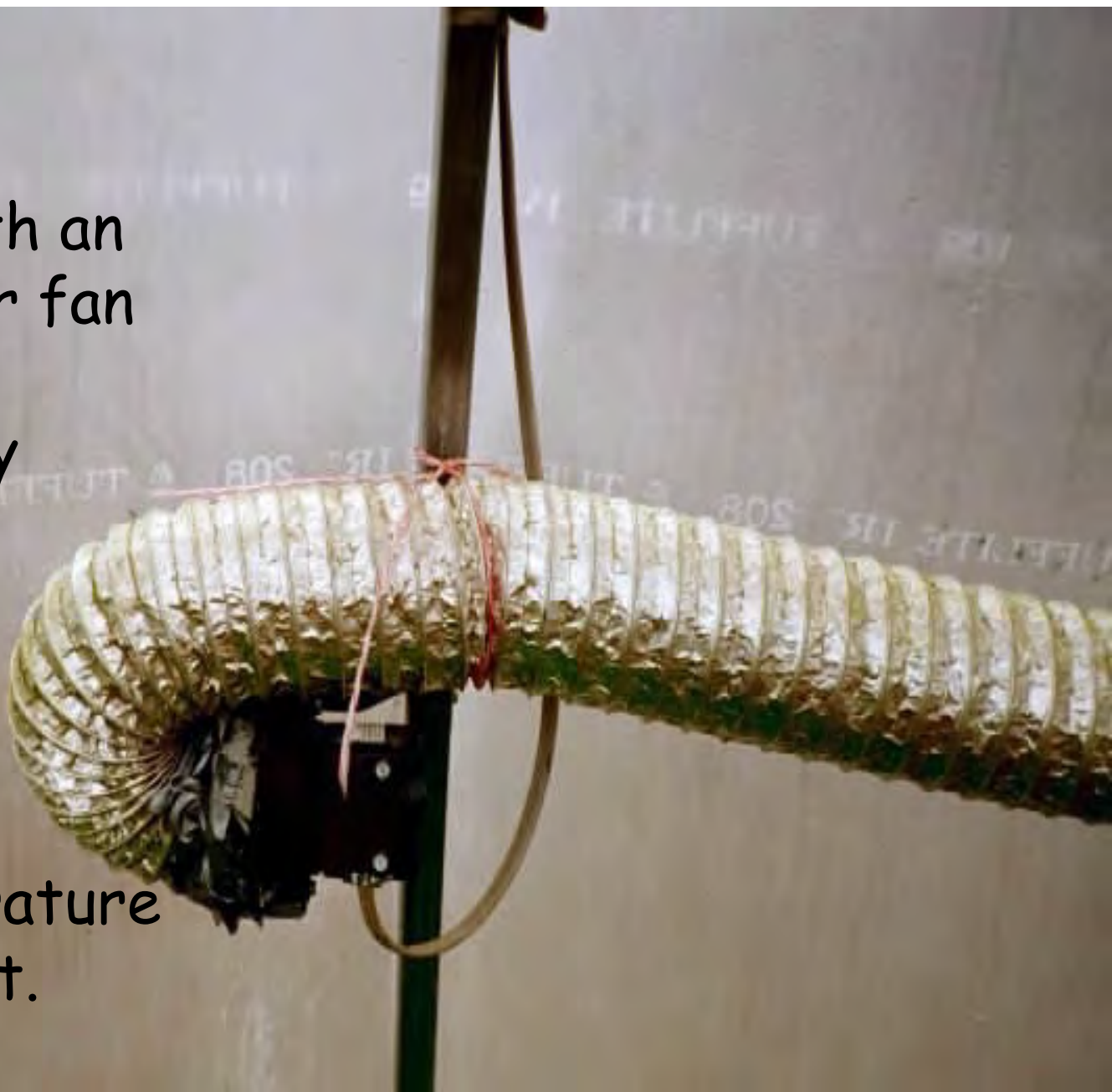
We constructed our high tunnels with multiple windows in both endwalls which allowed us to “gently” ventilate, even on the coldest days with frozen precipitation on the ground. Windows were built to allow us to only open halfway for venting on the coldest days.






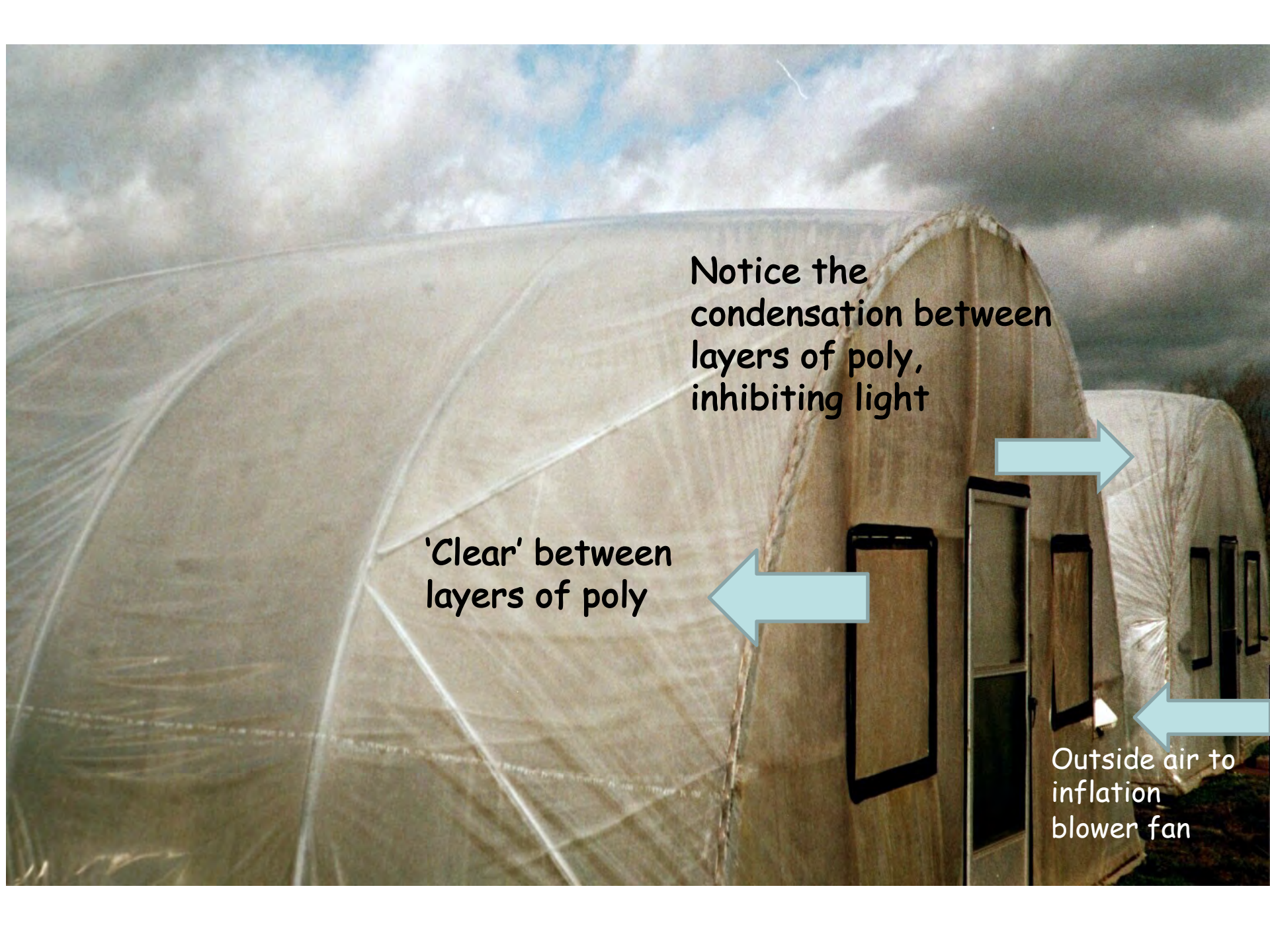
Double poly with an
inflation blower fan

The double poly
gave us an
additional
8 degrees at
plant height
compared to
the low temperature
outside at night.



The image shows the interior of a long, arched greenhouse. The structure is covered in white plastic, and the roof is supported by a series of dark, curved metal ribs. The floor is covered in dark brown soil, and rows of young green plants are visible, growing in straight lines. The perspective is from one end of the greenhouse, looking down the length of the structure. The lighting is bright, coming from the open end of the greenhouse.

It also kept the soil
temperature above 45 degrees,
maintaining soil microbial
activity



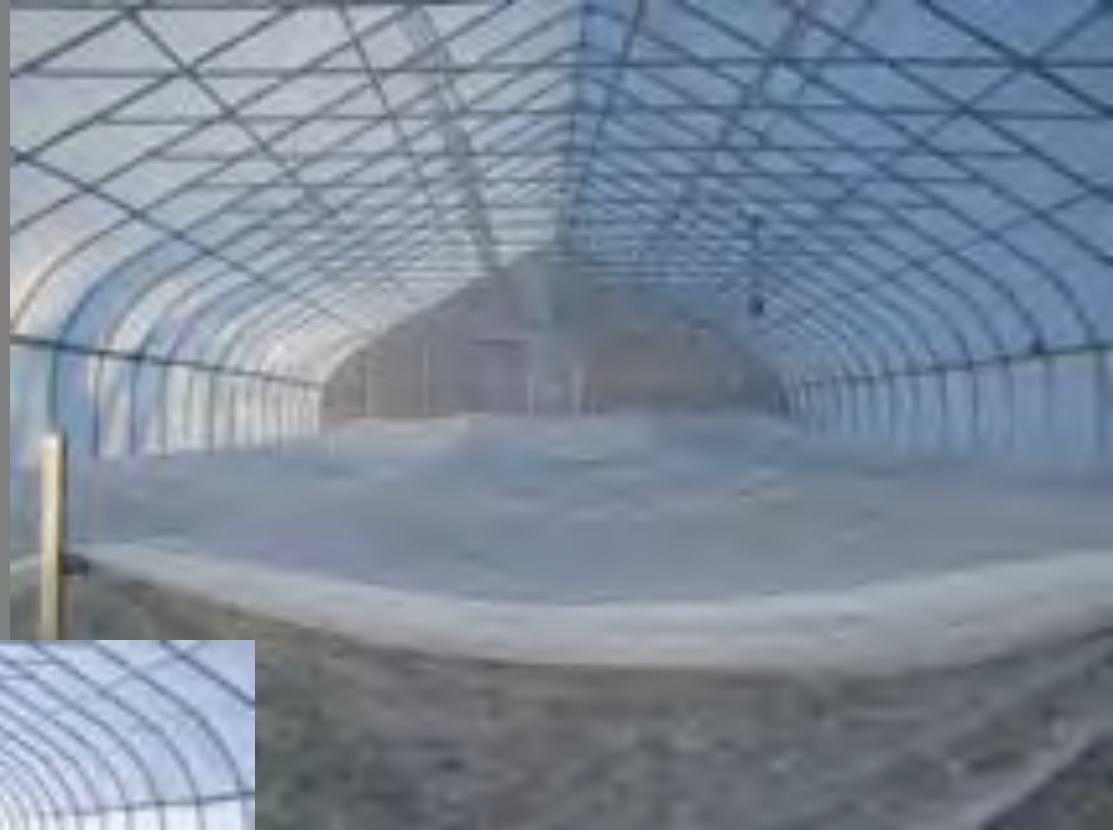
Notice the
condensation between
layers of poly,
inhibiting light

'Clear' between
layers of poly

Outside air to
inflation
blower fan



Sample of an inner row cover to protect plants on cold nights.
picture courtesy MSU



Pictures courtesy
Adam Montri, MSU



Inner row cover support system made out of EMT (conduit) held together with cable ties.

Picture courtesy Beth Spaugh, REHOBOTH Homestead Farm, NY



Here they are in
Mid-February ready to
harvest!





Some of the other
crops we were growing
in our winter high
tunnels

Brassica transplants -
Pak Choi, Red Pak Choi,
Tatsoi and
Chinese Cabbage









Tatsoi

Chinese cabbage



Chinese Cabbage

- *Napa type*
- *50 ~ 60 days from seeding*
- *Good quality*
- *Early*





We grow a number of different kales during the winter, including Red Russian, White Russian and Wild Garden, with Redbor in the foreground.

The white is more productive, but the reds adds a lot of color to the bunch, so I plant 3 to 4 white to every red, mixing them into the planting so that I can harvest and bunch as I pick.



Winterbor Kale on the left & a trio of kales below, including Red Russian, Tuscan (Lacinato) & curly kale.



Swiss Chard









Sugar Snap Peas



Storage Onions -
seeded in October





Pulled in late February and into mid-March. Note how densely they are growing.

Being transplanted on 4" centers, within the row, through plastic mulch.

4 Rows of drip irrigation with drippers on 4" centers.

So in a 96' long high tunnel, with a 90' long bed, about 2160 onions

Harvested early summer



Onions
harvested and
drying in the
loft of our barn.



A man in a dark jacket and light blue jeans is walking away from the camera through a greenhouse. The greenhouse is filled with tall, dense green weeds. The structure of the greenhouse is made of metal poles and translucent plastic covering. There are two windows visible in the background. The text "Onions & Carrots and a lot of weeds..." is overlaid on the right side of the image.

Onions &
Carrots and a lot
of weeds...



Overgrown carrots ~ but they still sold like hotcakes!!

Radishes






French Breakfast Radishes - D'Avignon, are a big hit with our customers.



Hakurei turnips ready to be transplanted from a 200 plug flat

A wicker basket filled with fresh vegetables, including several bunches of salad turnips with long green stalks and a few red radishes. The basket sits on a tablecloth with a red and green floral pattern. A black chalkboard sign is placed in front of the basket.

Salad Turnips



Yes, believe it or not...Potatoes!
We purchase organic potatoes from the grocery store in August, sprout them and plant very early September.













Mid-December Potato harvest

Well grown plants on average yield a pound or more per 'hill' or plant. We plant 3 "hills" across in our 42" beds, on 12" centers, staggering the middle row.



Herbs





Dill and Cilantro



Some of our winter crops in January





Strawberries -
planted in September
and harvested in early
Spring!



11 25 '02

So, what do we grow?

Mesclun

Spinach

Arugula

Carrots

Spicy Baby Greens

Braising mix

Red and green leaf lettuce

Red and green Romaine lettuce

Red and green Bibb lettuce

Red and green Oak leaf lettuce

Johnny's Selected Seeds Salanova lettuce

Kales ~ Russian, Curly Kale (Winterbor), Tuscan Kale

Collards

Swiss Chard

Pac Choy, Tat Soi, Chinese Cabbage, Napa Cabbage

Hakurei Turnips

Beets

Radishes (French Breakfast, cherry)

Onion transplants

Bunching onions

Potatoes

Strawberries

Herbs

