

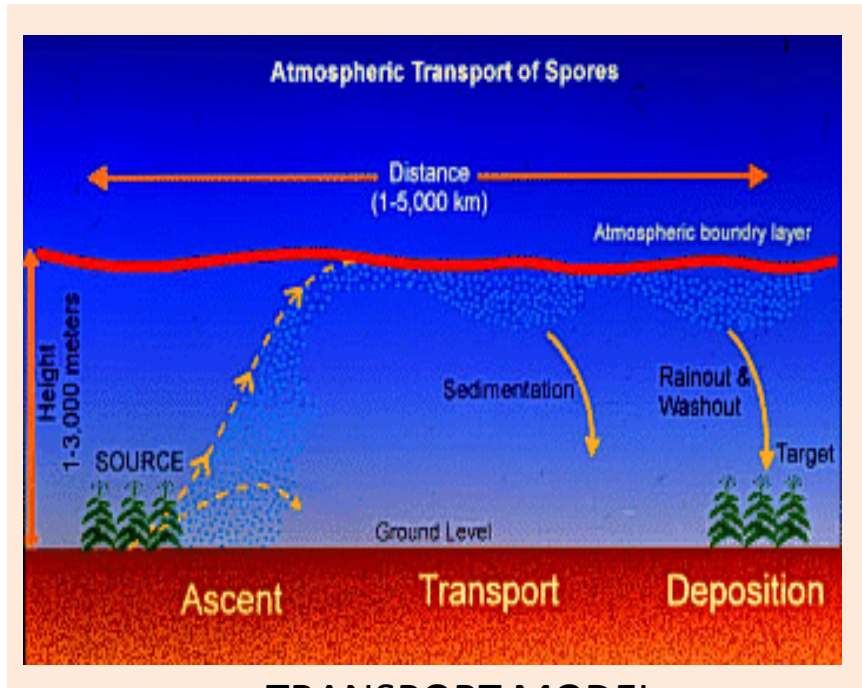
# SPORE EXCLUSION HIGH TUNNEL



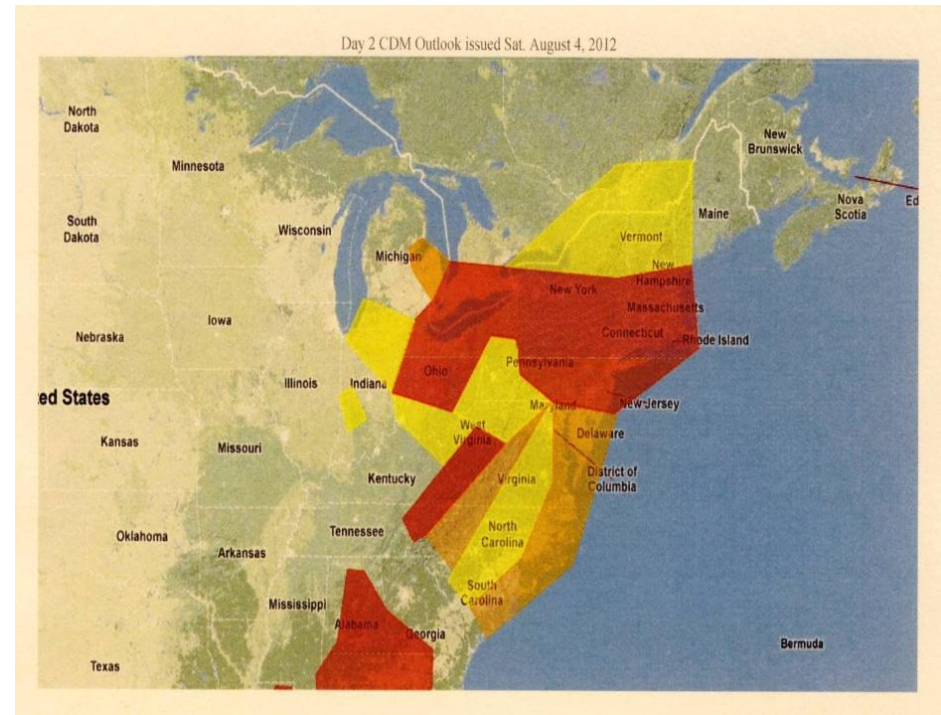
LOU LEGO  
ELDERBERRY POND FARM  
AUBURN, NEW YORK

# DOWNEY MILDEW INFECTIONS

FROM WHERE? HOW ? AND WHEN?



TRANSPORT MODEL



IPM PIPE- CDM ALERT SYSTEM

THE PREDICTIONS ARE REALLY GOOD, BUT WHAT DO YOU DO?  
PARTICULARLY, IN A HIGH TUNNEL

# QUESTION?

Could the spores that cause downy mildew and tomato late blight be excluded from a plastic tunnel during an infection period using inexpensive anti-allergen furnace filters?



## TWO NE SARE FARMER GRANTS

2009 – Low Tunnel Experiment

30 ft. tunnel two filters



2012 – High Tunnel Experiment

96 ft. tunnel 15 filters





# METHODS FOR BOTH EXPERIMENTS:

PLANT CUCUMBERS IN LATE SPRING IN OUTSIDE CONTROL PLANTINGS, IN A CONVENTIONAL TUNNEL WITH ROLL UP SIDES, AND IN A SPORE EXCLUSION ENCLOSURE

USE VARIETIES NOT REQUIRING POLLINATION, HAVING SOME CLAIMS FOR DM RESISTANCE AND HAVING GOOD TO EXCELLENT EATING QUALITIES.

USE NC STATE DM WEBSITE FOR DISEASE MAPPING AND INFECTION PREDICTIONS

SOIL TESTS IN ALL SITES

ABBY SEAMAN TECHNICAL ADVISOR FOR BOTH TESTS

Note: Floating Row Covers were also evaluated for spore exclusion possibilities during the 2009 Experiment



## RESULTS OF THE 2009 TESTS

One of the worst CDM seasons- First Infection in early August

Treated Row Covers delayed Infections by about a week

Spore Exclusion Tunnel had no infections –  
surrounded by infected plants

Microscope photos showed filters loaded with spores



Control Bed

Spore Exclusion  
Tunnel

## ISSUES TO BE ADDRESSED IN THE 2012 HIGH TUNNEL TESTS

Could a Large Tunnel be closed tightly enough?

Temperature /Humidity Control- Would Plants cook during Infection Periods with Sides rolled down?

How to enter and exit Spore Exclusion Tunnel- During Infection Period

How much Air Flow was needed ? How many Filters ?

Could Tunnel be re-opened following an infection period?

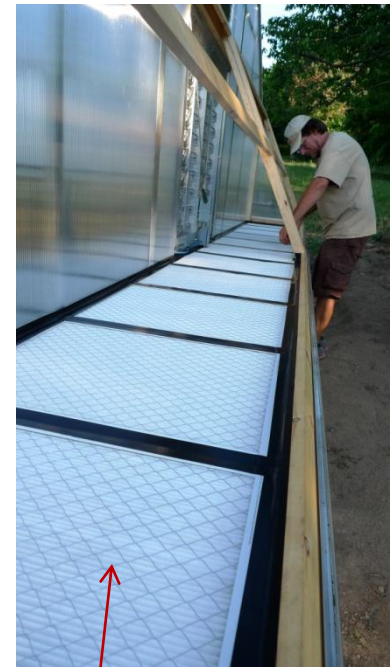
**THERE WERE LOTS OF DOUBTERS**

# DESIGN OF THE SPORE EXCLUSION HIGH TUNNEL

All air blown into tunnel goes through filters



“Aluminet” Cloth to separate hot air at top to be vented out



15 - 3M Lowe's  
Filtrete Furnace Filters

Lots of water for irrigation  
to feed the evaporation

Plants trellised high for trans-evaporation



# RESULTS FROM 2012 HIGH TUNNEL EXPERIMENT

Tunnel completed and tested by end of June- Only one glitch

Cucumber Plants- All varieties at all locations beginning to climb up trellis in early July

Watching daily e-mail warnings from CDM Alert System

First NY Infection-Suffolk County August 4<sup>th</sup>

First in our area August 8<sup>th</sup>.

Tunnel closed down in Spore Exclusion Mode –August 8th

AUGUST 11<sup>TH</sup> – 95 deg F outside- Recorded temperature and Relative Humidity every minute for 24 hour period in Conventional and Spore Exclusion Tunnel.

Temperature in SE Tunnel was a few degrees higher during hottest period  
Relative Humidity was a bit lower

AUGUST 20<sup>TH</sup>- Infection during a light rain. Outside Plants showed symptoms in three days.  
Leaves sent to NC State for analysis– Confirmed CDM Infection

NO INFECTION IN EITHER TUNNEL

SEPT 9<sup>TH</sup> Infection spotted in conventional tunnel

Outside and Conventional House second plantings infected within days

**NO INFECTIONS OCCURRED IN SPORE EXCLUSION THROUGH END OF OCTOBER WHEN ALL PLANTS WERE REMOVED**

# CONCLUSIONS:



## SPORE EXCLUSION HOUSE WORKED AS ANTICIPATED :

INTERNAL PRESSURE WAS ABOUT PERFECT ON LOWEST SPEED  
NO ENTRANCE/EXIT PROBLEMS

TEMPERATURE AND HUMIDITY CONTROL WAS GREAT  
IN HOTTEST DRIEST SUMMER IN HISTORY

USED LOTS OF WATER, BUT NO MORE THAN CONVENTIONAL ROLL UP HOUSE

REOPENED HOUSE BETWEEN INFECTION PERIODS- BUT NOT THE WORST CDM YEAR

TOTAL ELECTRIC COST FOR SUMMER WAS ABOUT \$80 –  
COULD BE CHEAPER WITH SOLAR ASSIST





**BIGGEST SURPRISE TO ME WAS DRAMATIC SIZE AND HEALTH AND YIELD OF PEPPER, TOMATO AND CUCUMBER PLANTS COMPARED TO CONVENTIONAL TUNNEL NOT SURE WHY DIFFERENCE!**

Note: Final Report is available by searching National SARE Farmer Grant Database under NE SARE- New York “Spore Exclusion Tunnel” Our thanks to NE SARE!