I. P. M.

Integrated Pest Management

In an IPM program, important pests are monitored, all suitable pest management methods are considered and decisions on what methods to use are based on ecological, economic and sociological values. The task is to integrate cultural practices, plant resistance, biological control and pesticide application to best resist the pest problem.

- Pirone's Tree Maintenance, Chapter 13

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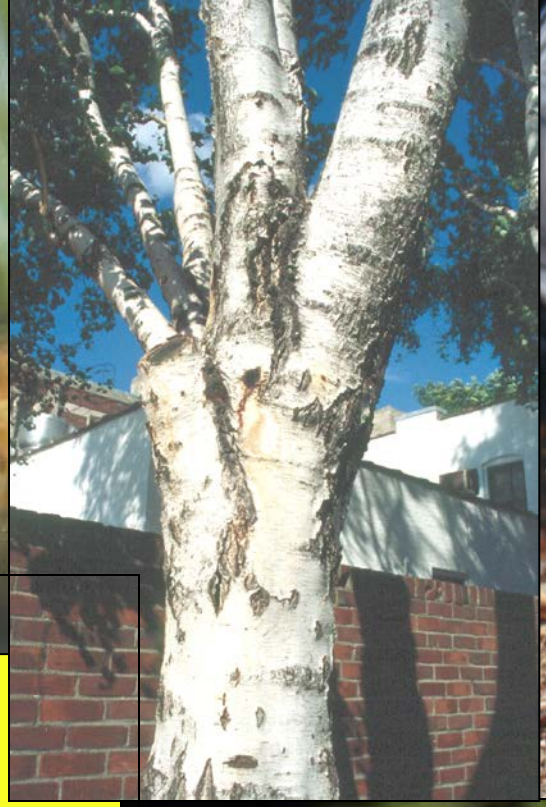
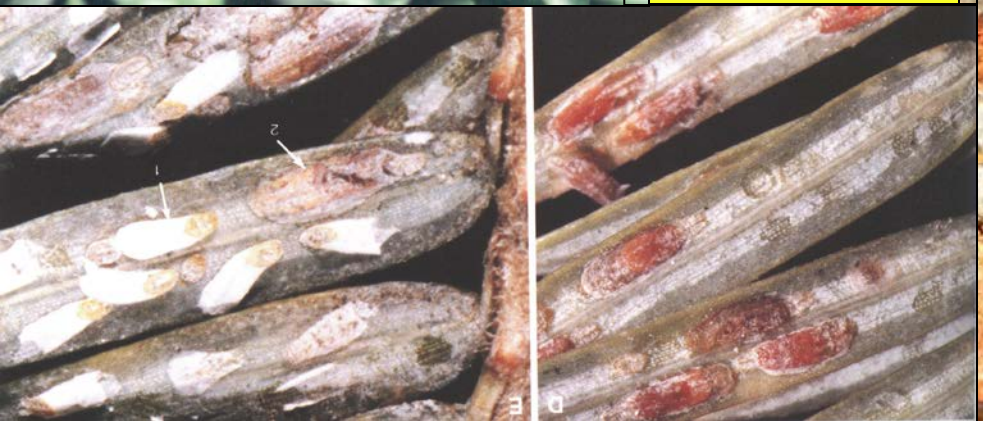
- Pirone's Tree Maintenance, Chapter 13


274






UGA0949056


UGA3057088


UGA2733033


UGA0355036

Pest Control

Integrated Pest Management

Plant Health Care

I. P. M. Definitions:

An integrated pest management (IPM) program which incorporates every pest control method suited for a particular site can be used to manage landscape tree pests. All phases of tree maintenance need to be considered and be compatible with pest management objectives.

P. P. Pirone, *Tree Maintenance*

I. P. M. Definitions:

Integrated Pest Management (IPM) is the use of a variety of methods designed to achieve the needed level of pest control with the most judicious use of pesticides. Wherever applicable, IPM uses scouting, pest trapping, pest-resistant plant varieties, sanitation, various cultural control methods, physical and mechanical controls, biological controls, and precise timing and application of needed pesticides. With IPM, pesticides should be applied only when needed, and no other control method will provide effective management. When a decision has been made to use a pesticide, the safest and most effective product should be selected for use. The goals of IPM are to achieve the needed level of pest control with the least and safest amount of pesticides.

Adams and Packauskas, *UConn Book*

I. P. M. Definitions:

Integrated Pest Management (IPM) is the use of a variety of methods designed to achieve the needed level of pest control with the most judicious use of pesticides. Wherever applicable, IPM uses scouting, pest trapping, pest-resistant plant varieties, sanitation, various cultural control methods, physical and mechanical controls, biological controls, and precise timing and application of needed pesticides. With IPM, pesticides should be applied only when needed, and no other control method will provide effective management. When a decision has been made to use a pesticide, the safest and most effective product should be selected for use. The goals of IPM are to achieve the needed level of pest control with the least and safest amount of pesticides.

Adams and Packauskas, *UConn Book*

I. P. M. Definitions:

IPM is a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health, and environmental risks.

National Coalition on IPM

Insects and Trees

Signs of Feeding

stipple marks on black cherry leaves

Diseases and Trees

Not all problems are by other organisms

Some are caused by one organism in particular

What are we controlling?

Why are controlling them?

ANNOUNCING:

soon to be a

A MAJOR MOTION PICTURE

THE GYPSY MOTH STORY

and how it influenced pest control
in the 20th century

starring

Lymantria dispar

ANNOUNCING:

soon to be a

A MAJOR MOTION PICTURE

THE SPONGY MOTH STORY

and how it influenced pest control
in the 20th century

starring

Lymantria dispar

THE SPONGY MOTH STORY

and how it influenced pest control
in the 20th century

starring

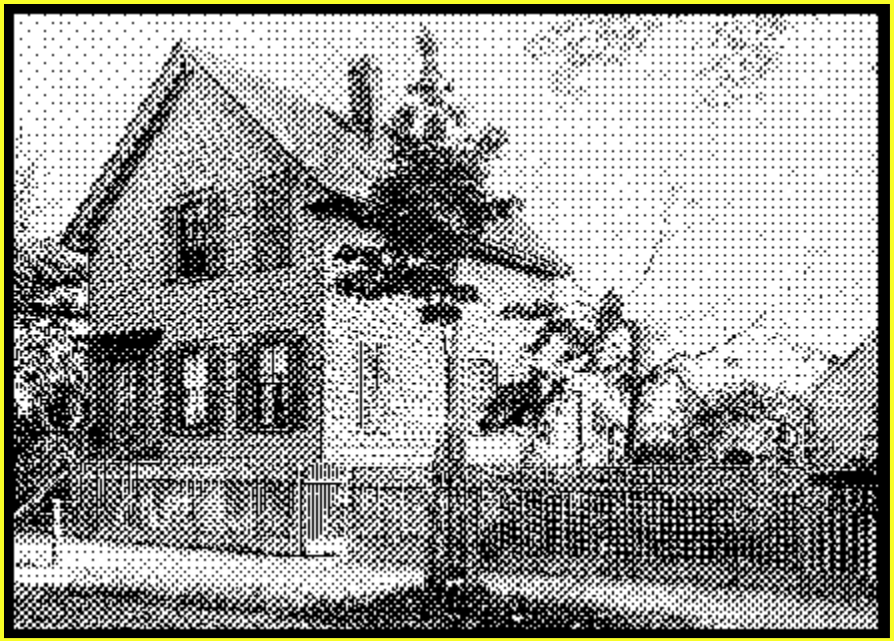
Lymantria dispar

and featuring:

E. Leopold Trouvelot
The Chestnut Blight
Dutch Elm Disease
Arsenate of Lead
DDT
the US Forest Service
Rachel Carson
Sevin
Bt
Foliar Spraying
lotsa money
and
the maimaiga fungus

E. Leopold Trouvelot, Perpetrator of our Problem

Ettiene Leopold Trouvelot was born on Dec. 26, 1827 in Aisne, France. He fled France during the coup d'etat in 1852 and settled in Medford, Massachusetts, a working-class suburb of Boston. He lived with his wife and family in his house at 27 Myrtle St. in Medford. Trouvelot made a living as an artist, painting mostly portraits, but he had an amateur interest in entomology. *His main interest was in identifying native silkworms that might be used for silk production.*



The exact reasons or circumstances are unknown, but in the late 1860's he returned from a trip to France with some spongy moth egg masses. He was apparently culturing them on trees in back of his house when some of the larvae escaped. Trouvelot understood the potential magnitude of this accident and notified local entomologists but no action was taken.

After this accident, Trouvelot apparently lost interest in entomology and became interested in Astronomy. He became famous for his illustrations of astronomical details of the sun and of Venus and was eventually given a faculty position at Harvard University in Astronomy. A crater on the moon was named in honor of Trouvelot and he won the French Academy's Valz prize for his astronomical research.

In 1882 Trouvelot returned to live in France; the timing of this move coincided with the appearance of the first spongy moth outbreak on his street. Trouvelot died in 1895.

The Spongy Moth

female moths laying eggs

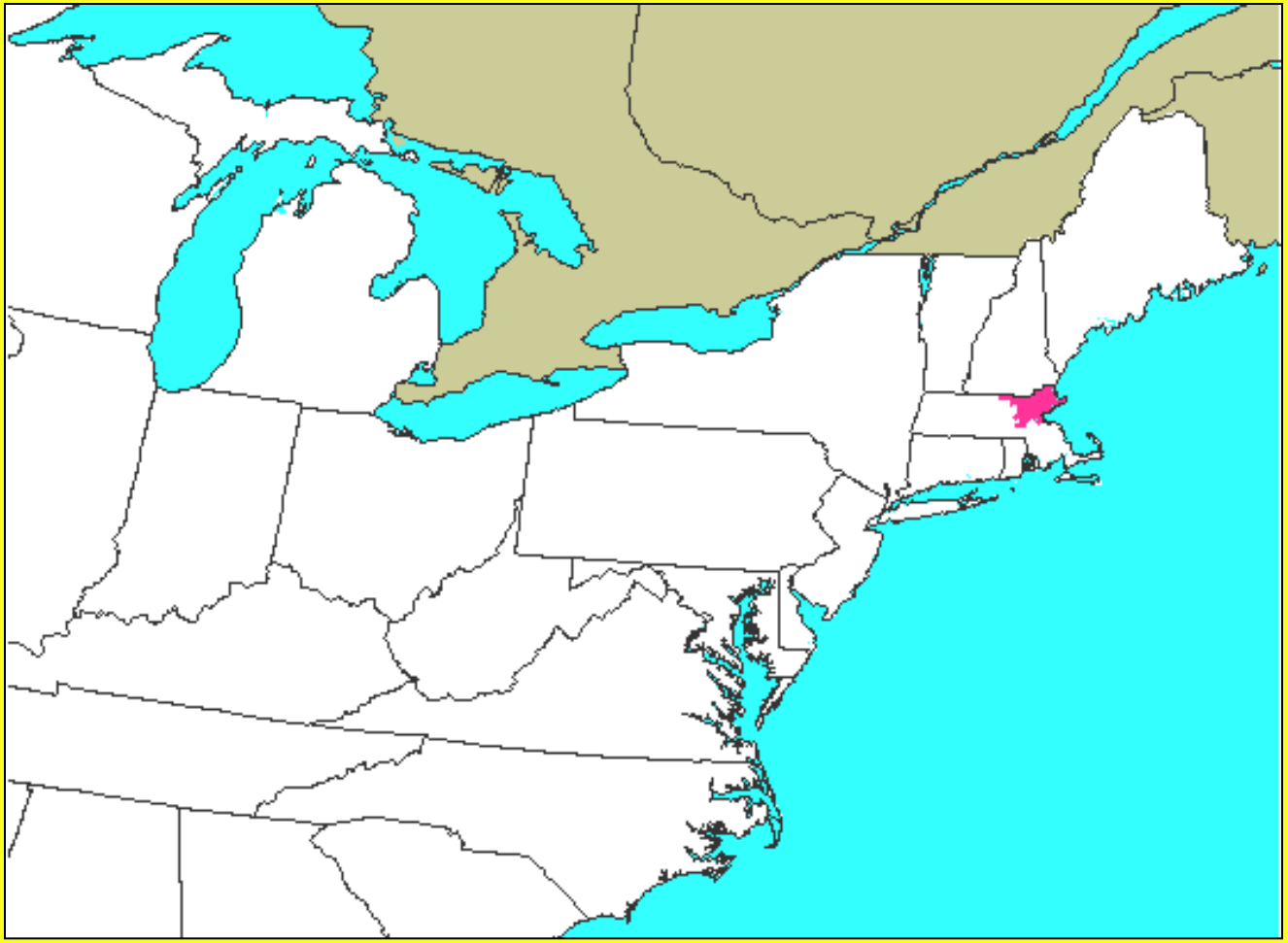
gypsy moth caterpillar

pupae

adult male

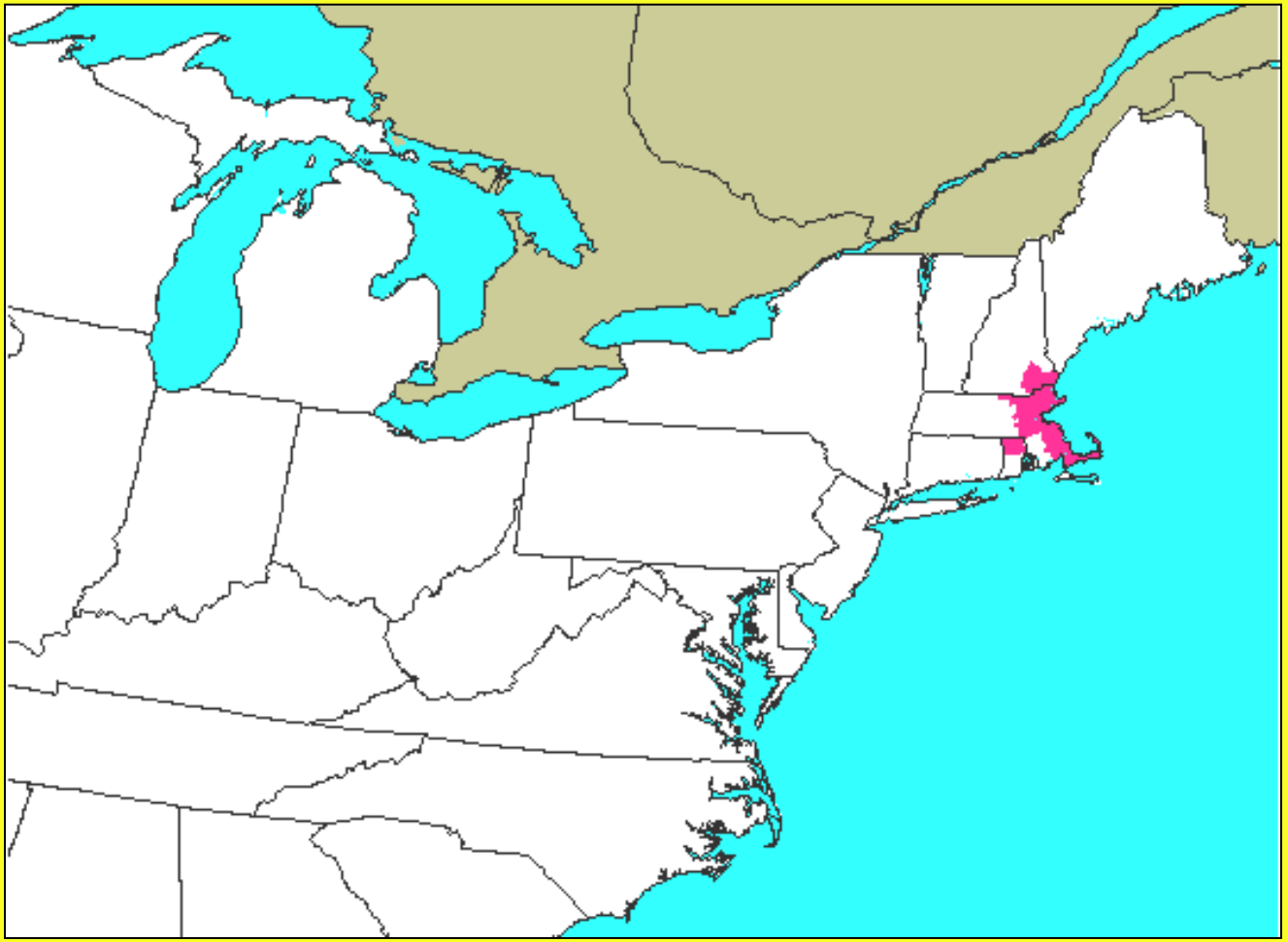

UGA2652051

Spongy Moth Spread - 1900



localized in Massachusetts

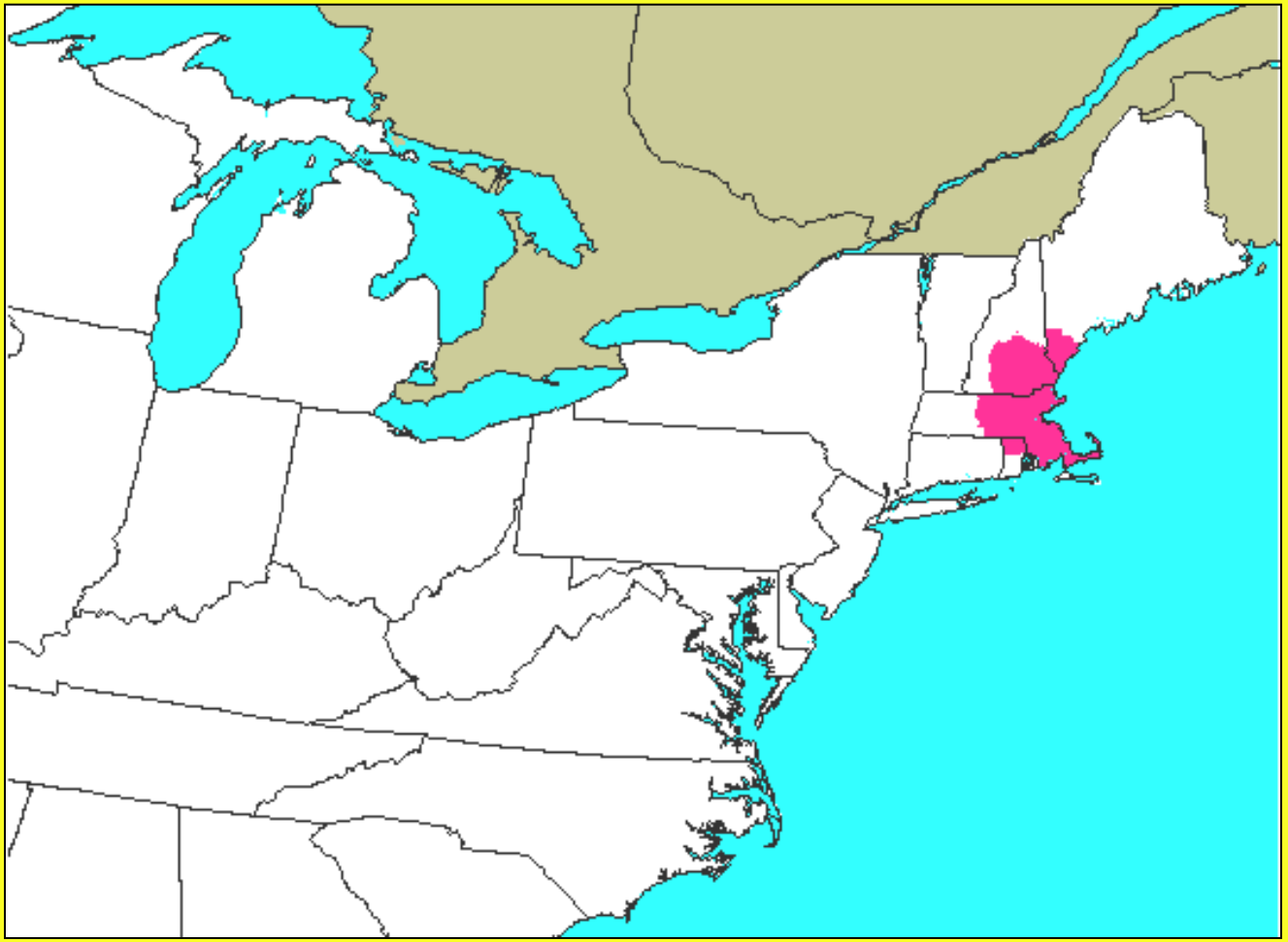
1905



hand picking of larvae

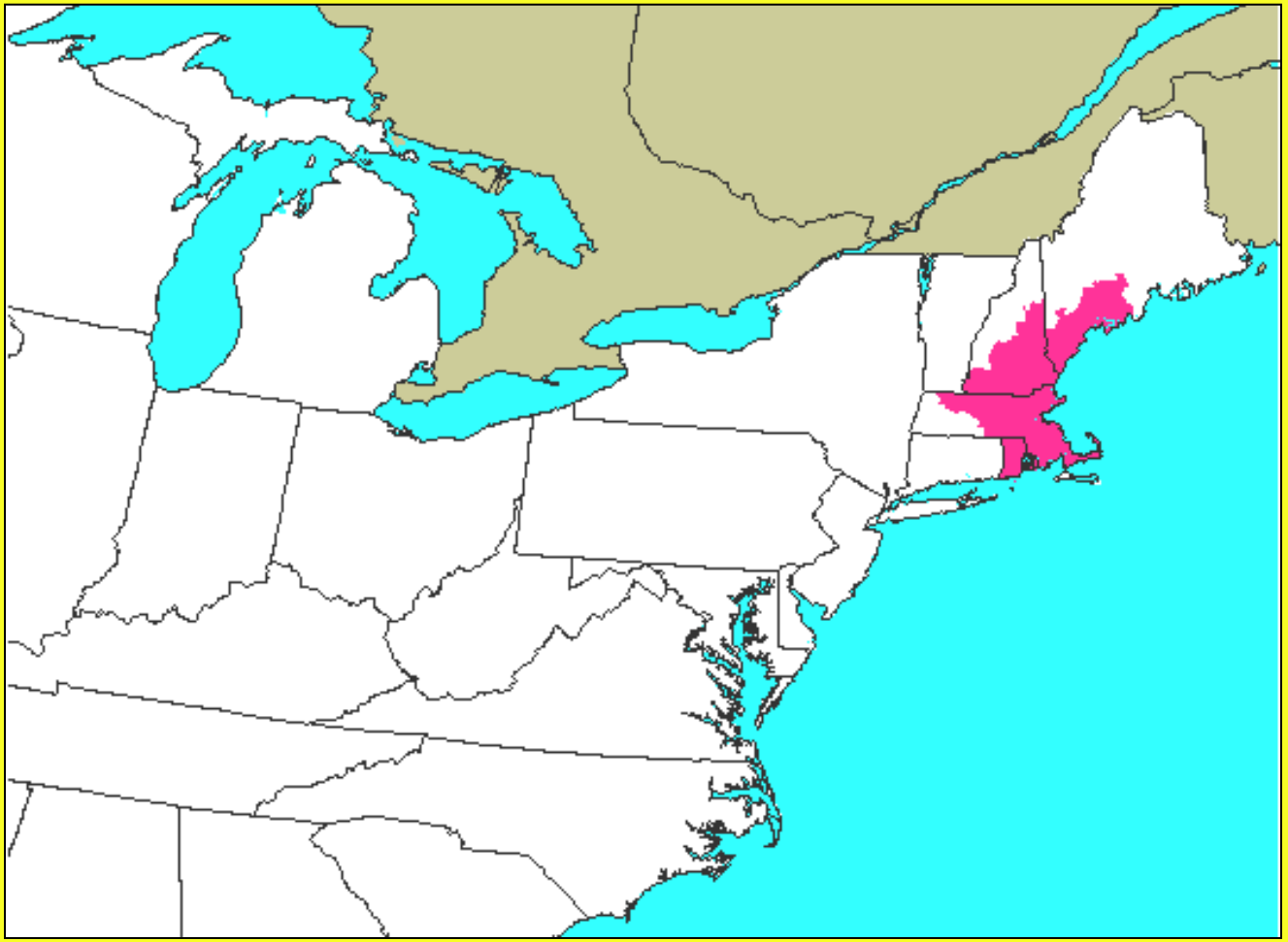
early IPM

1909



chestnut blight beginning to spread

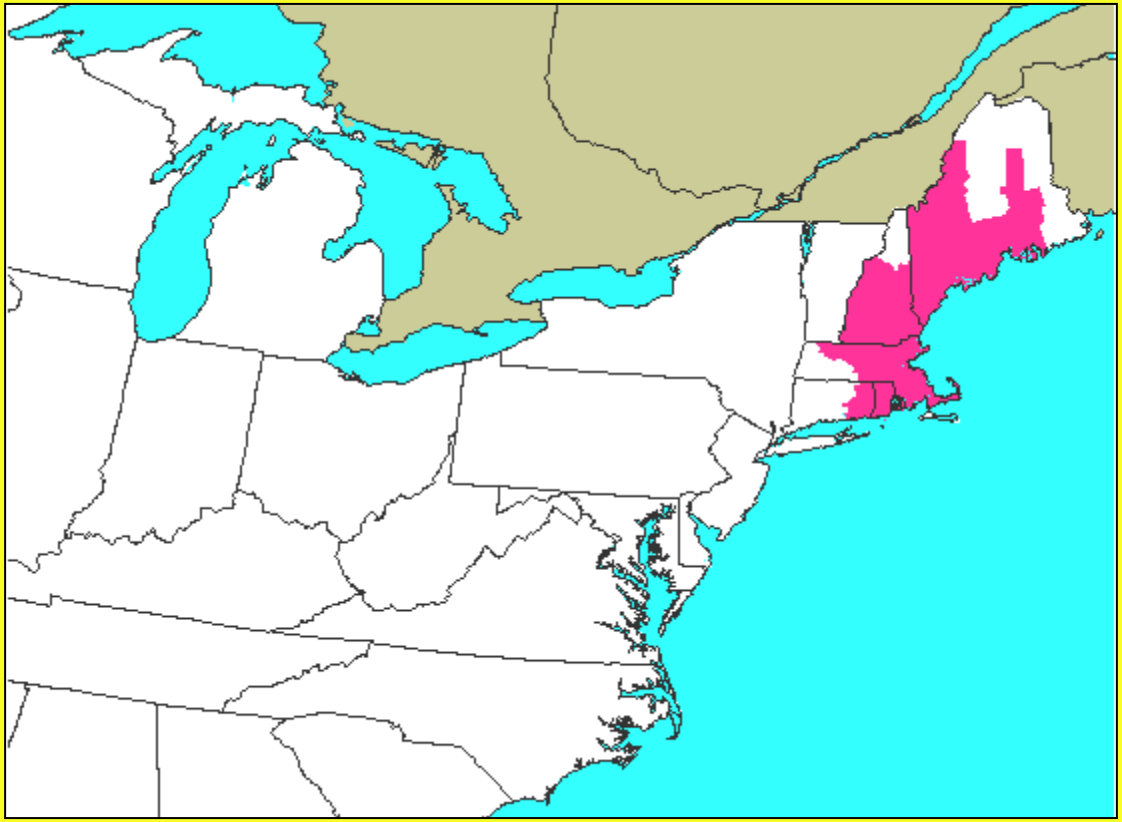
1912



lead arsenate

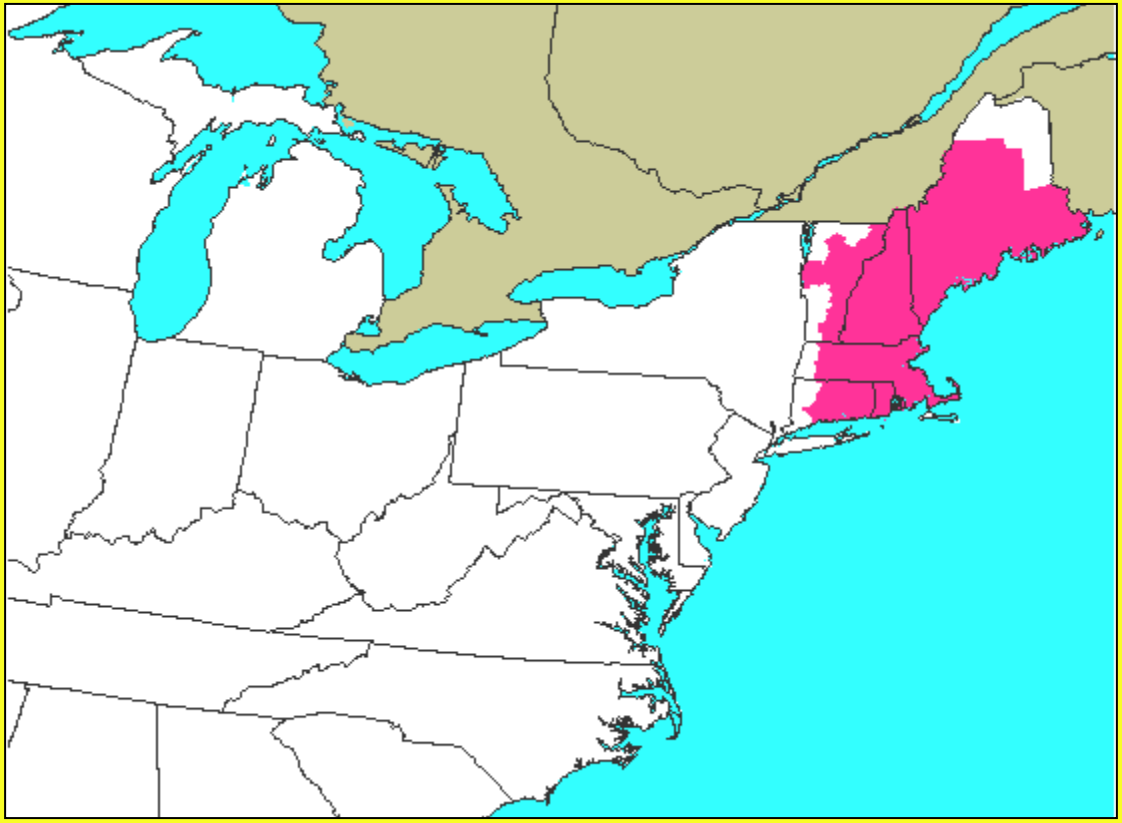

STATE of CONNECTICUT
MOTH WORK
No 1

1914



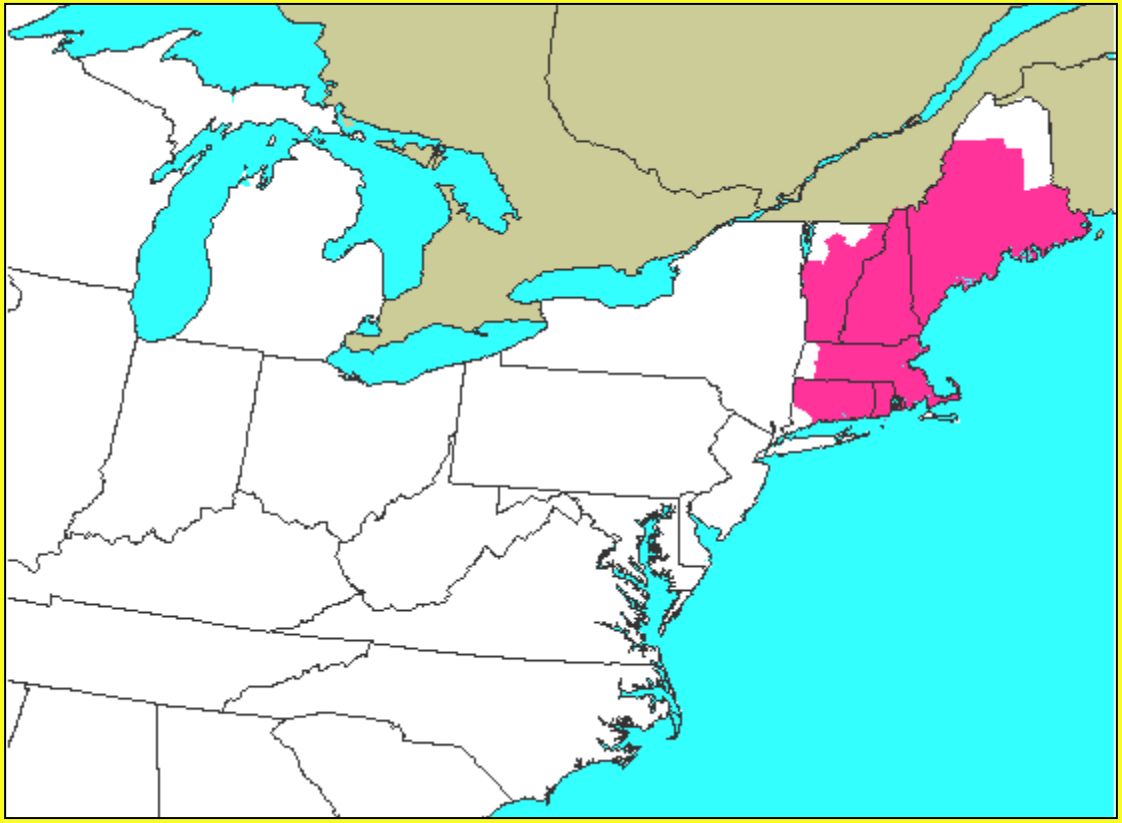
entry into Connecticut

1934



Dutch elm disease

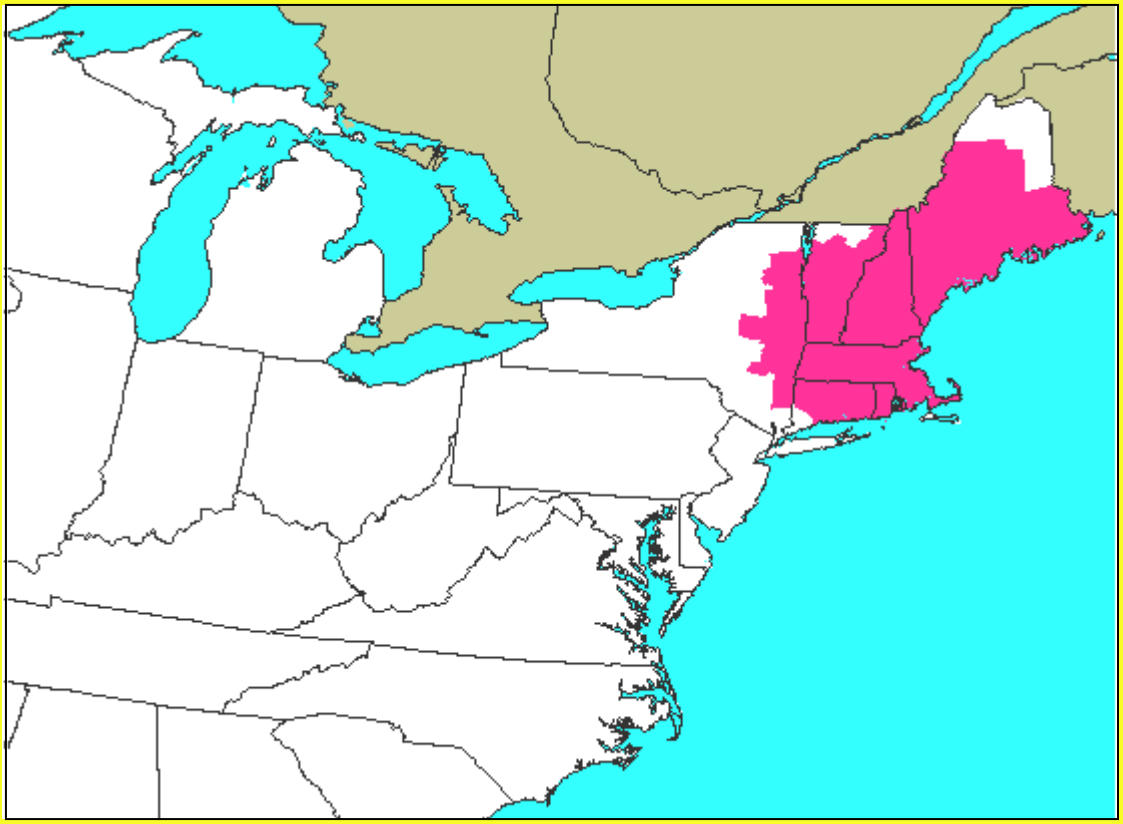
1938



The Hurricane of ‘38
continued use of harsh chemicals

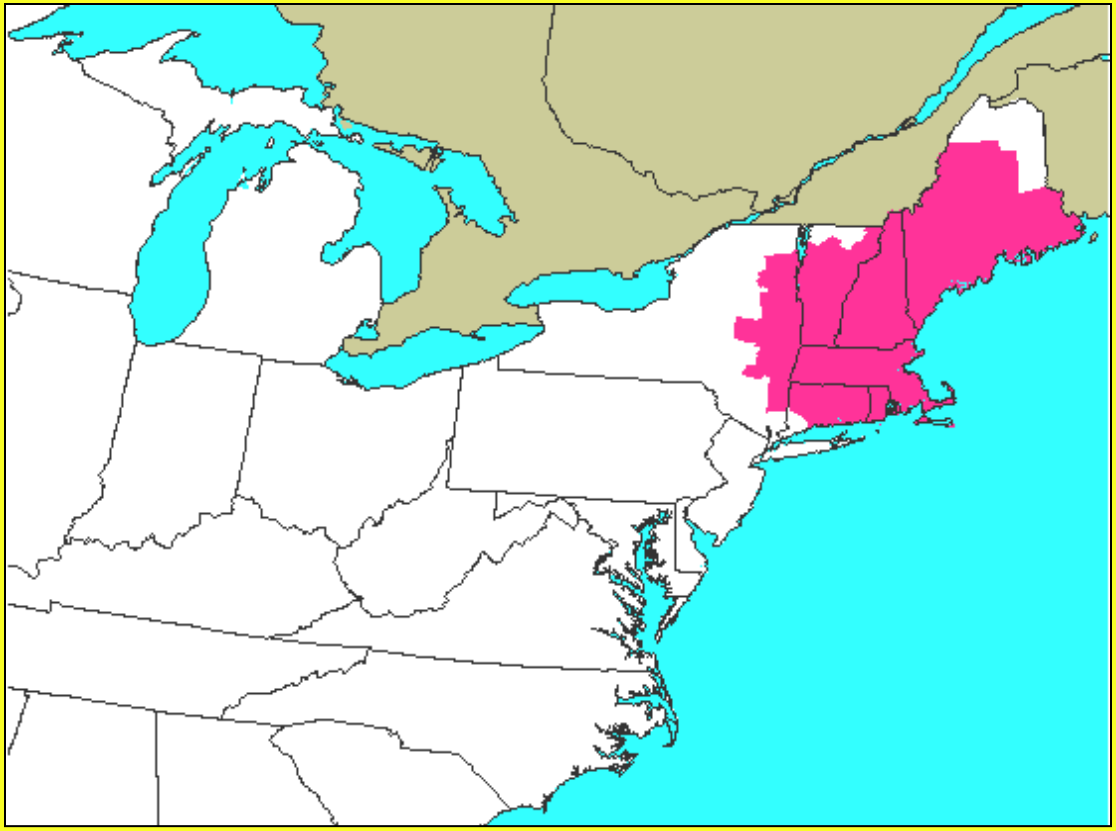
continued use of harsh chemicals

1945



end of World War II

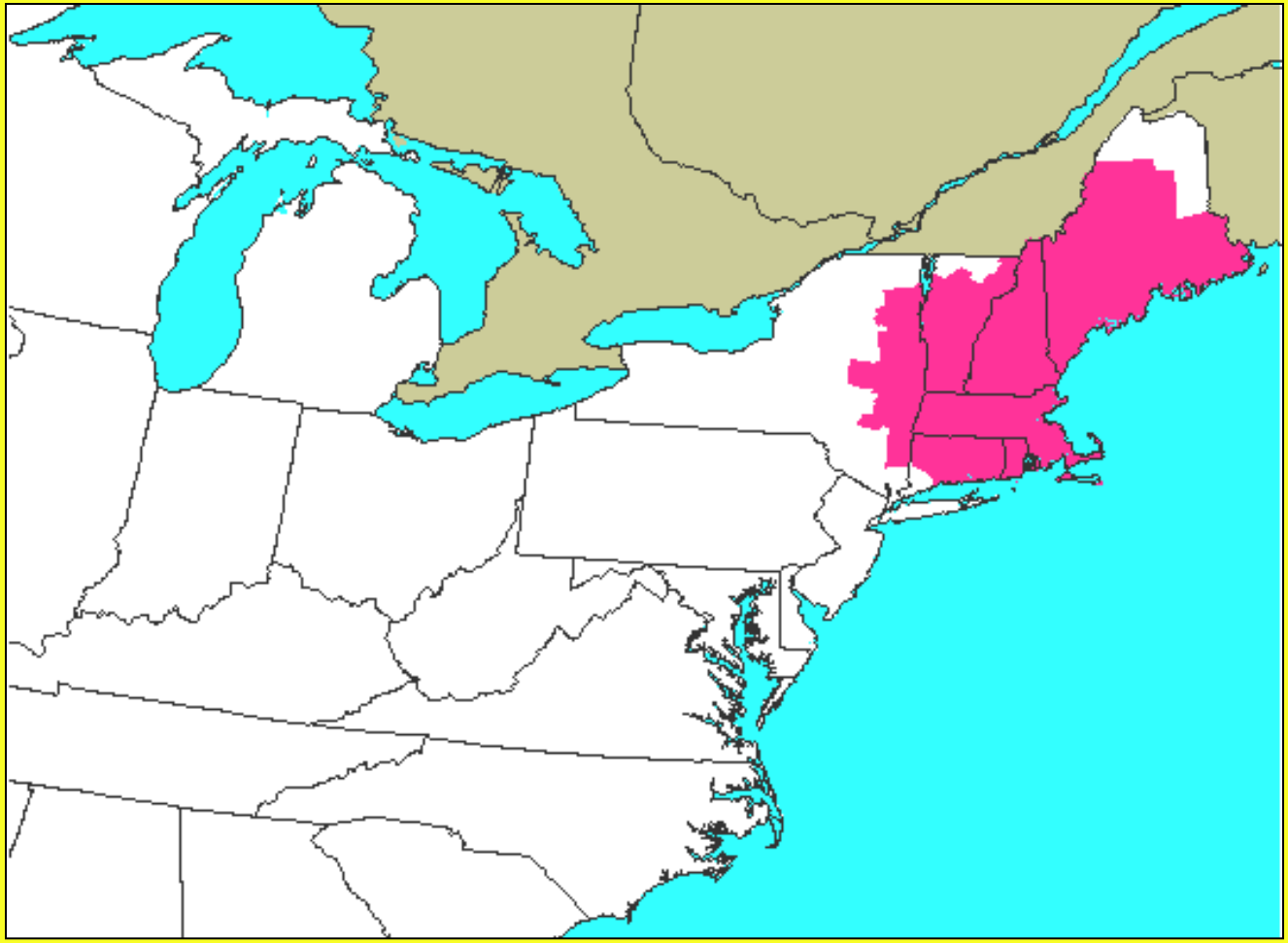
1949



DDT

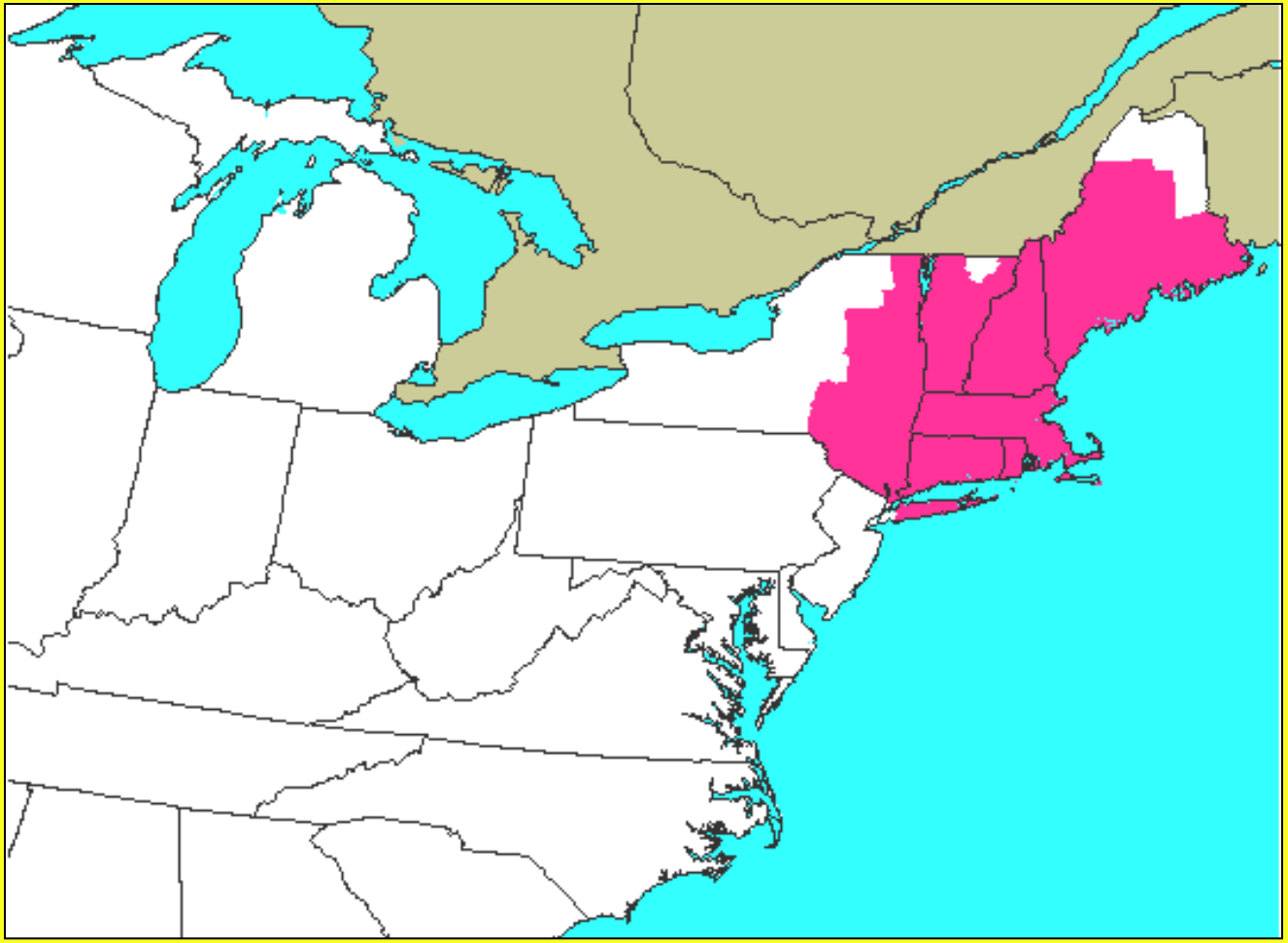
Elm Spraying

1955



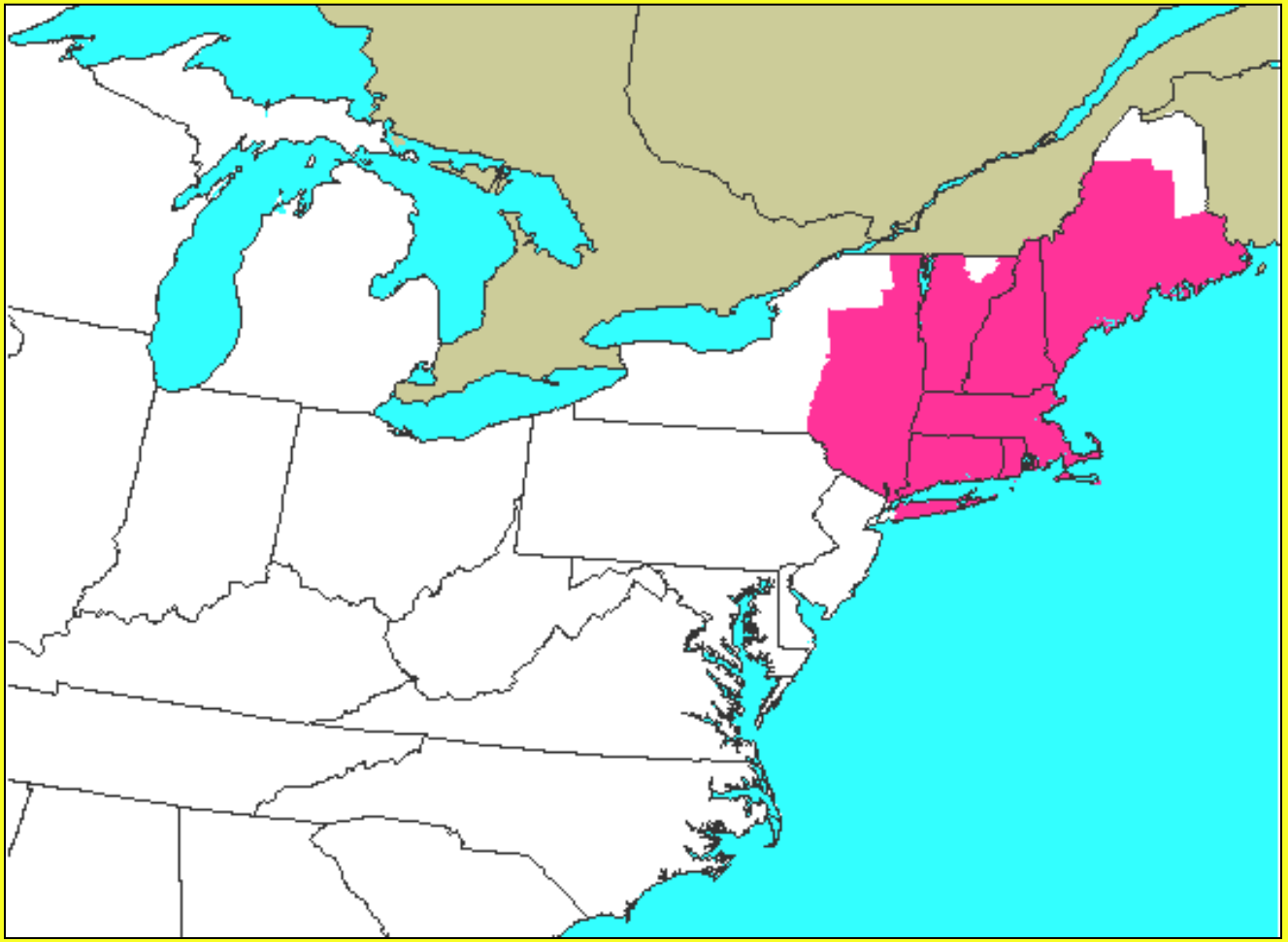
holding the line at the Hudson River

1960



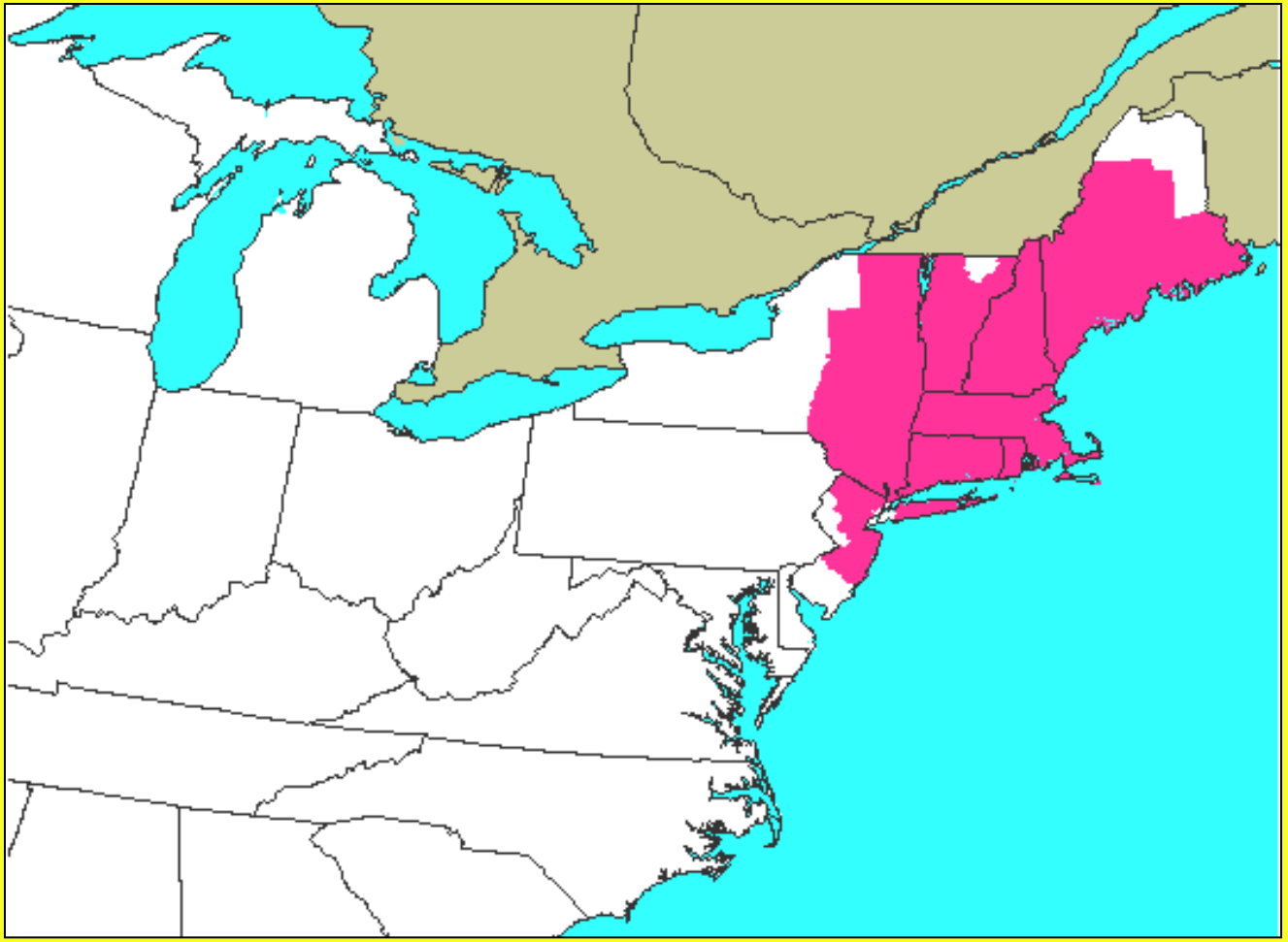
<u>Silent Spring</u> by Rachel Carson

1965



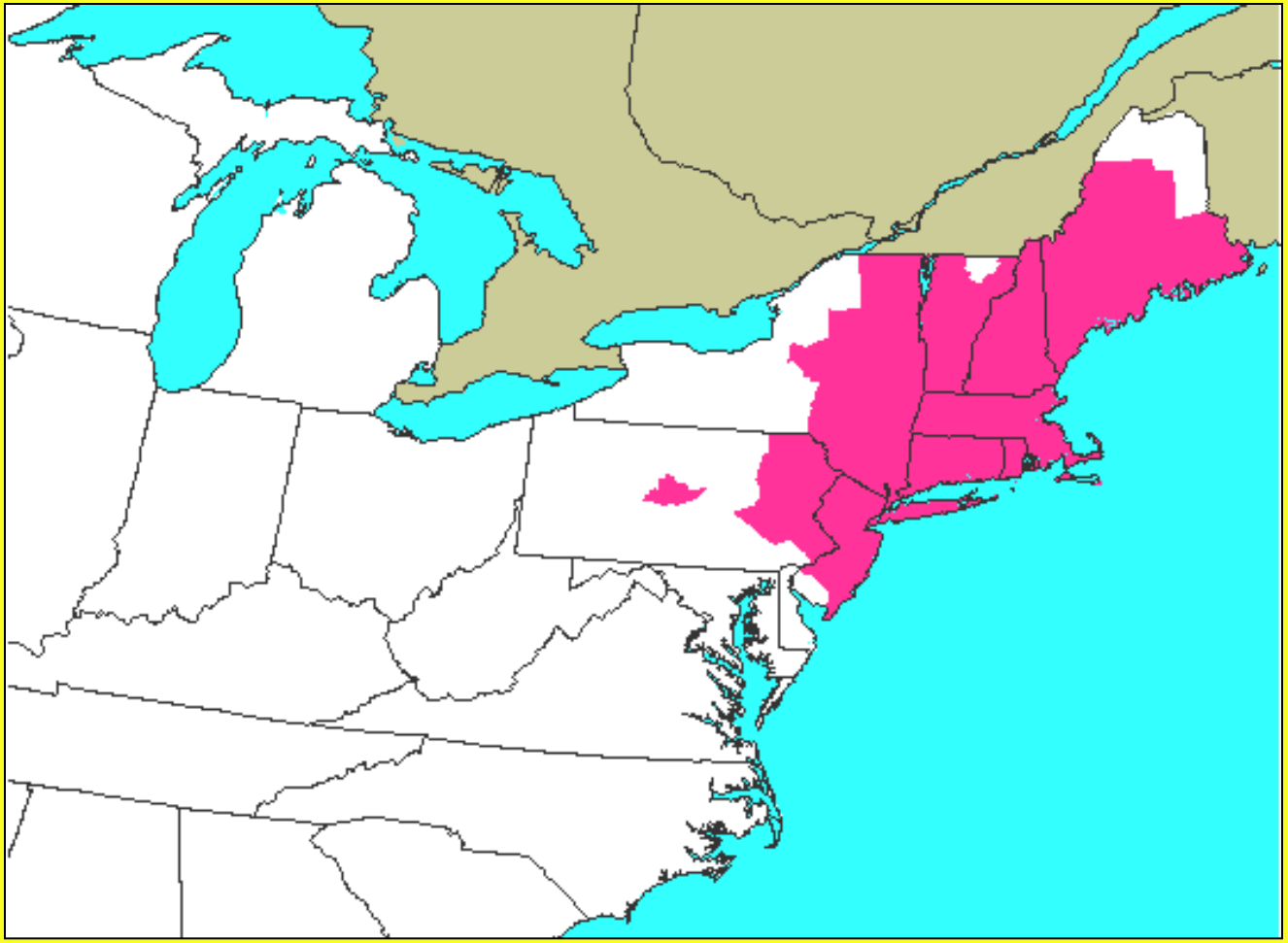
new generation of pesticides

1967



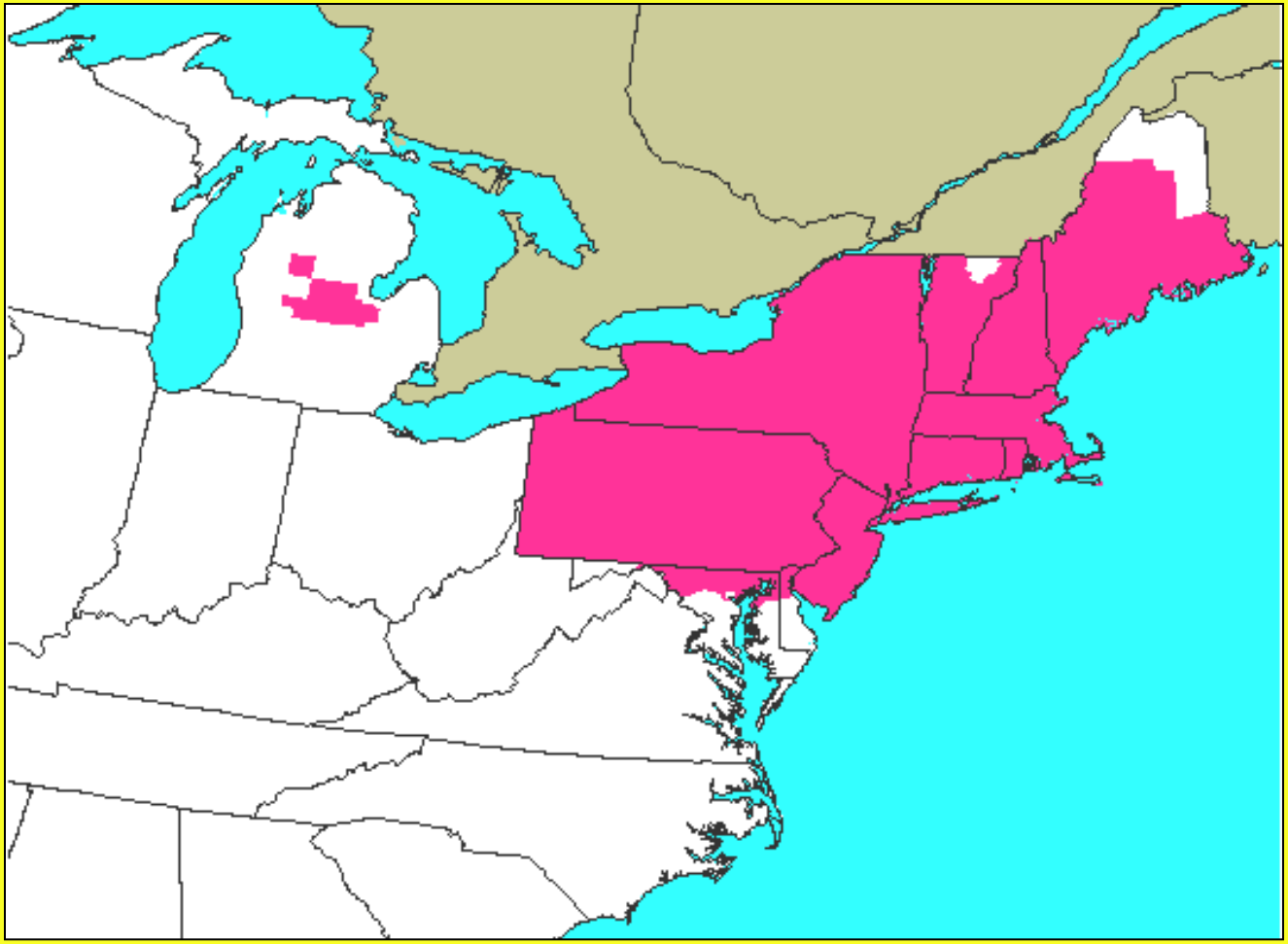
increasing severity of outbreaks

1971



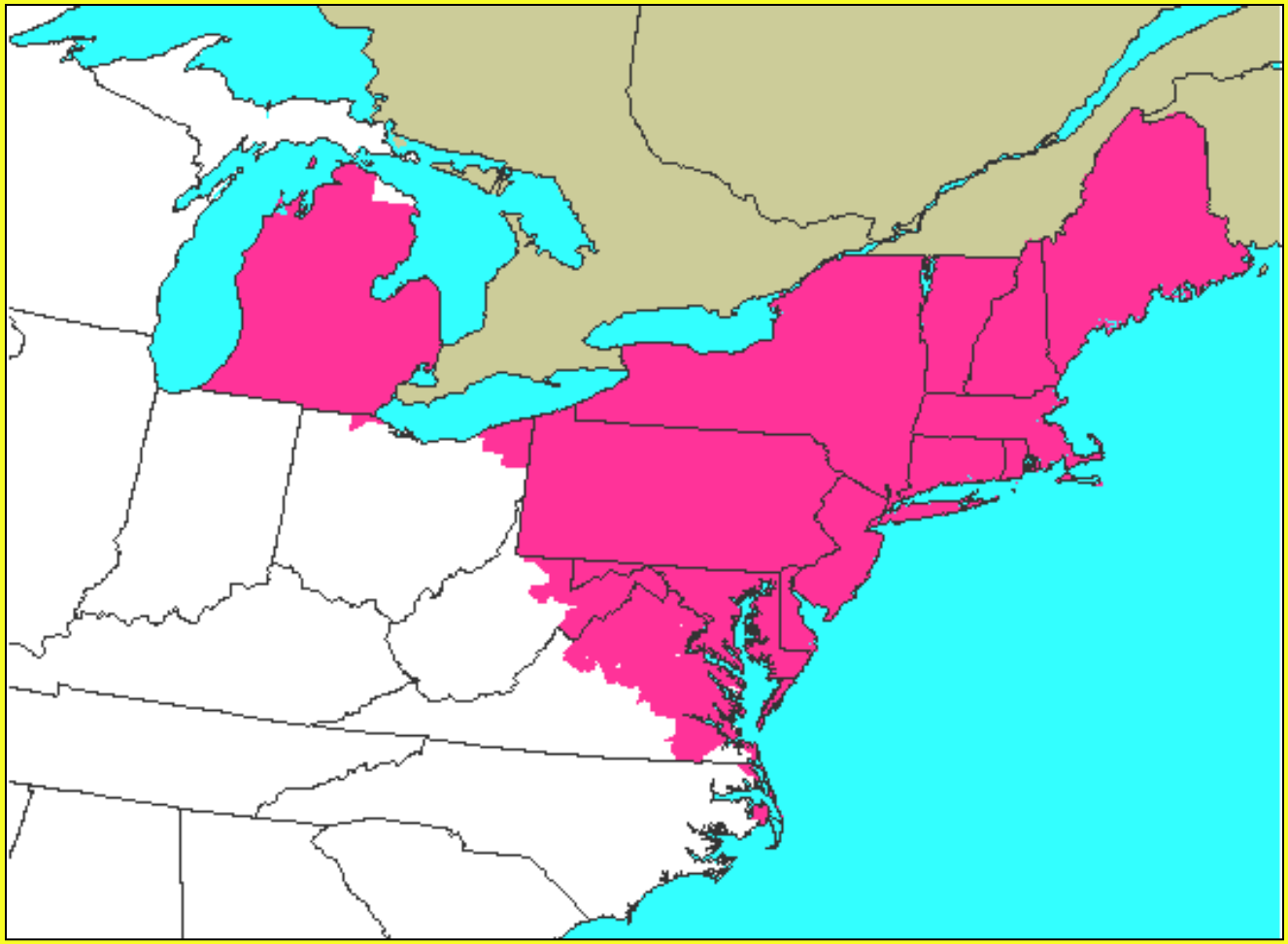
peak year in Connecticut

1981



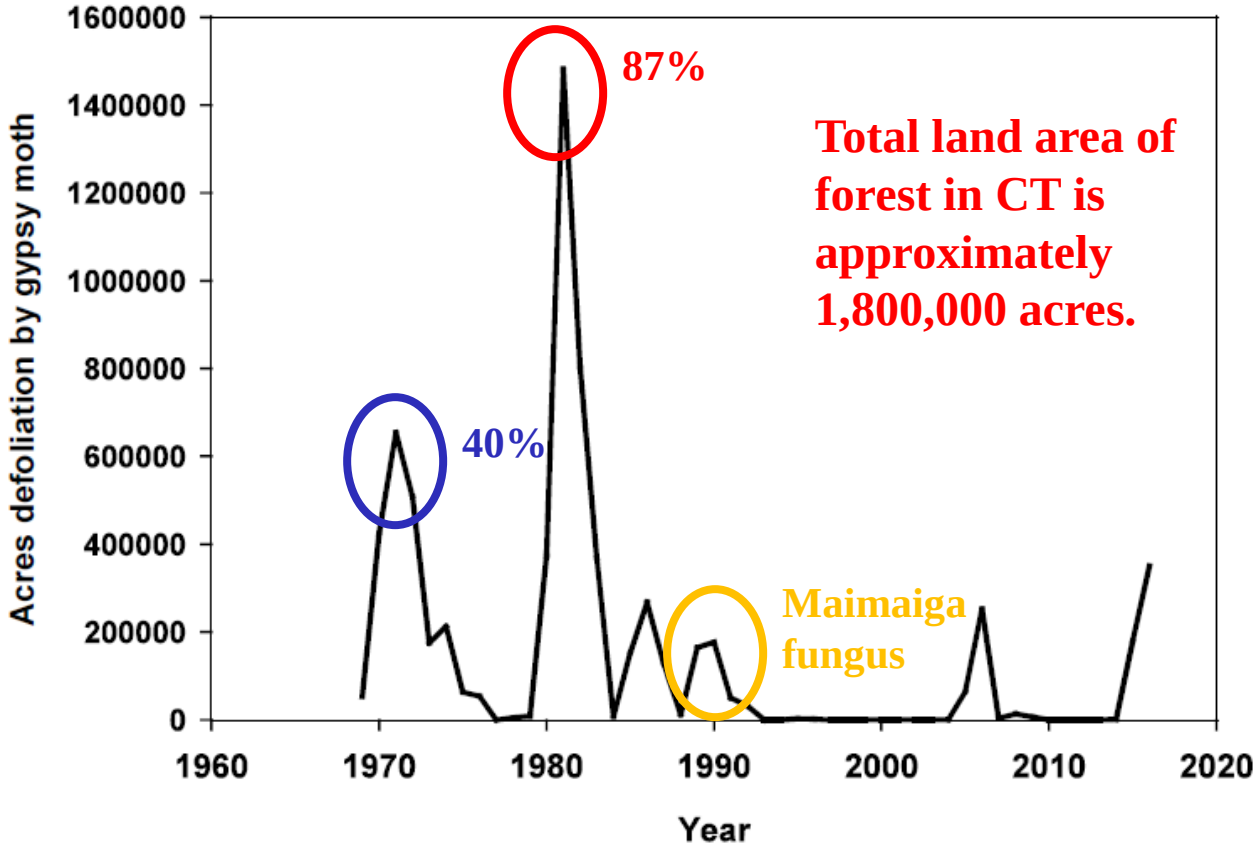
peak year for defoliation in Connecticut

1991



predicted peak year in Connecticut

Gypsy Moth Defoliation, CT 1969-2016* (acres)



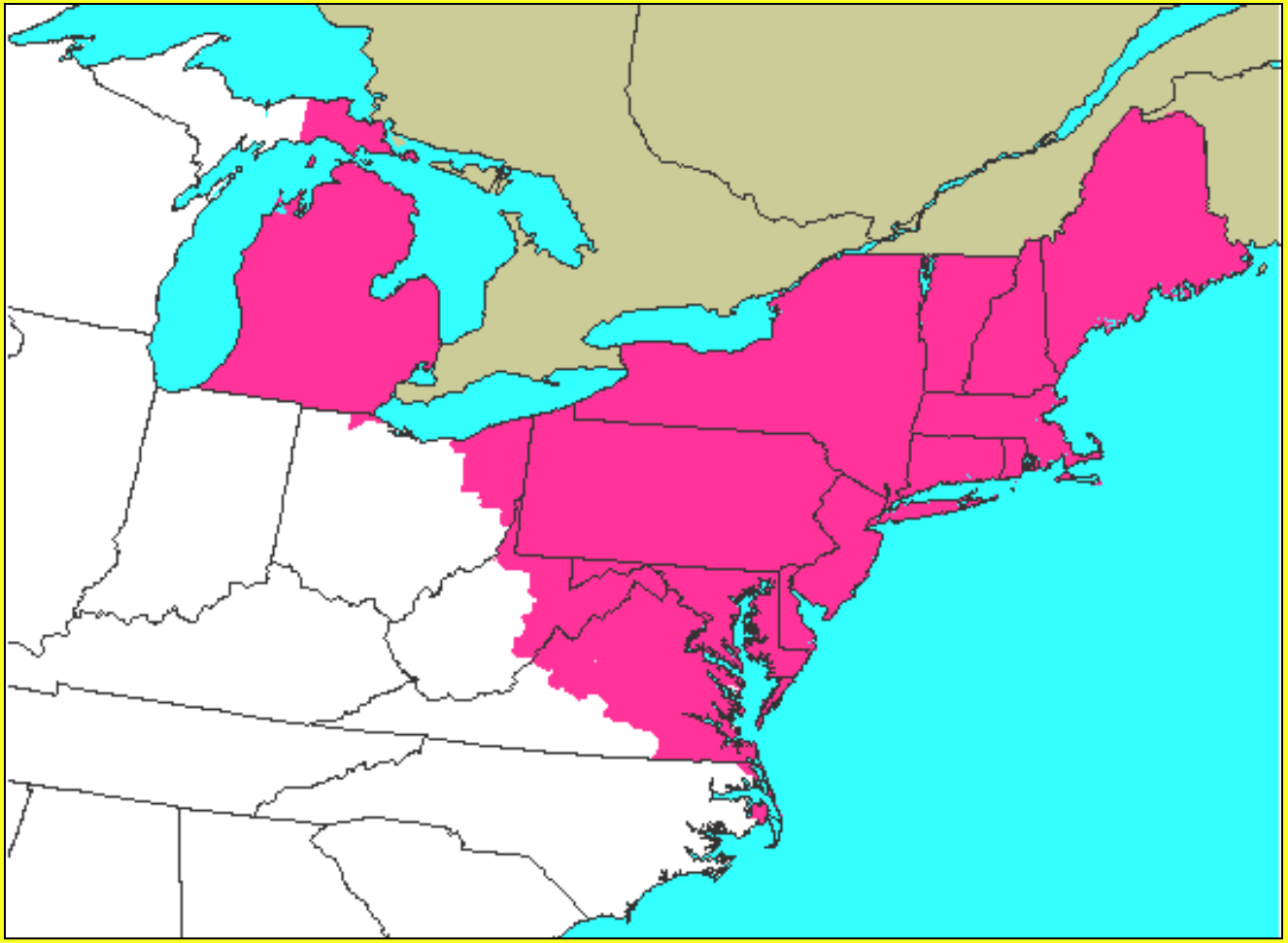
*2016 acreage estimated, final data pending.

CAES
The Connecticut Agricultural Experiment Station
Putting Science to Work for Society since 1875

The Maimaiga Fungus

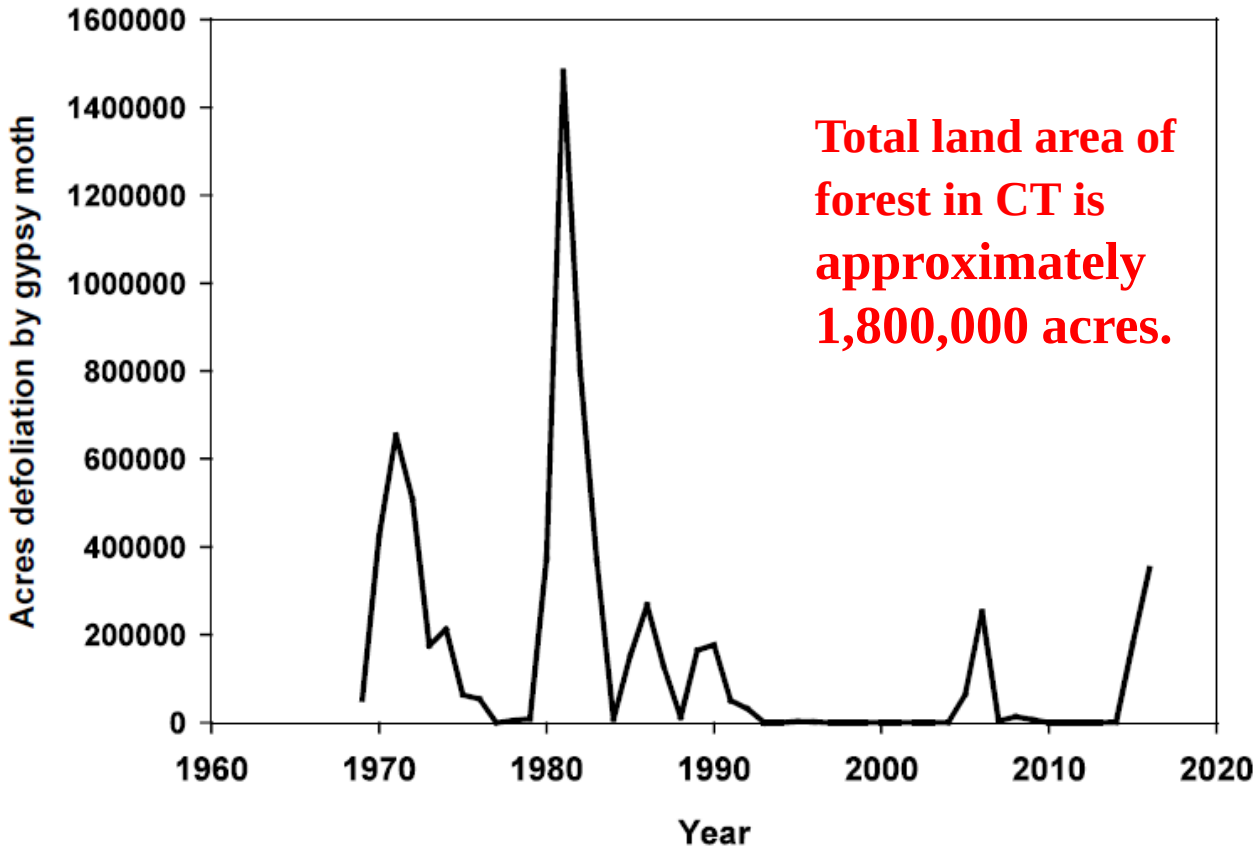
- Native to Japan
- Deliberately introduced several times as a bio-control – the first time in 1910, as recently as 1986
- Each time it flopped as a control – but it never went away
- 1990 and 1991 were wet springs in Connecticut
- Conditions were right and it exploded
- Starting in 1991, it became established and never went away
- Remains dependent on wet springs to keep it active

1994



still spreading throughout the country

Gypsy Moth Defoliation, CT 1969-2016* (acres)



*2016 acreage estimated, final data pending.

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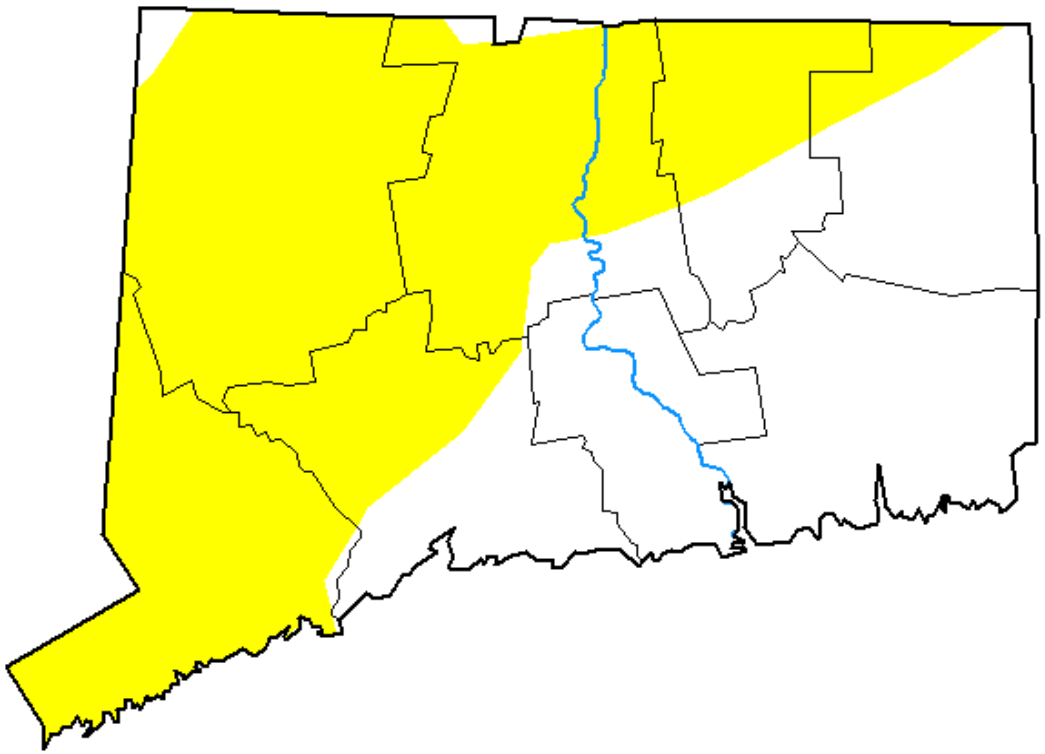
U.S. Drought Monitor

Connecticut



April 19, 2016

(Released Thursday, Apr. 21, 2016)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	43.27	56.73	0.00	0.00	0.00	0.00
Last Week *04-14-2016*	70.24	29.76	0.00	0.00	0.00	0.00
3 Months Ago *01-21-2016*	0.00	100.00	92.26	0.00	0.00	0.00
Start of Calendar Year *12-31-2015*	0.00	100.00	92.26	0.00	0.00	0.00
Start of Water Year *10-01-2015*	0.00	100.00	88.01	0.00	0.00	0.00
One Year Ago *04-23-2015*	100.00	0.00	0.00	0.00	0.00	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
Richard Tinker
CPC/NOAA/NWS/NCEP

droughtmonitor.unl.edu

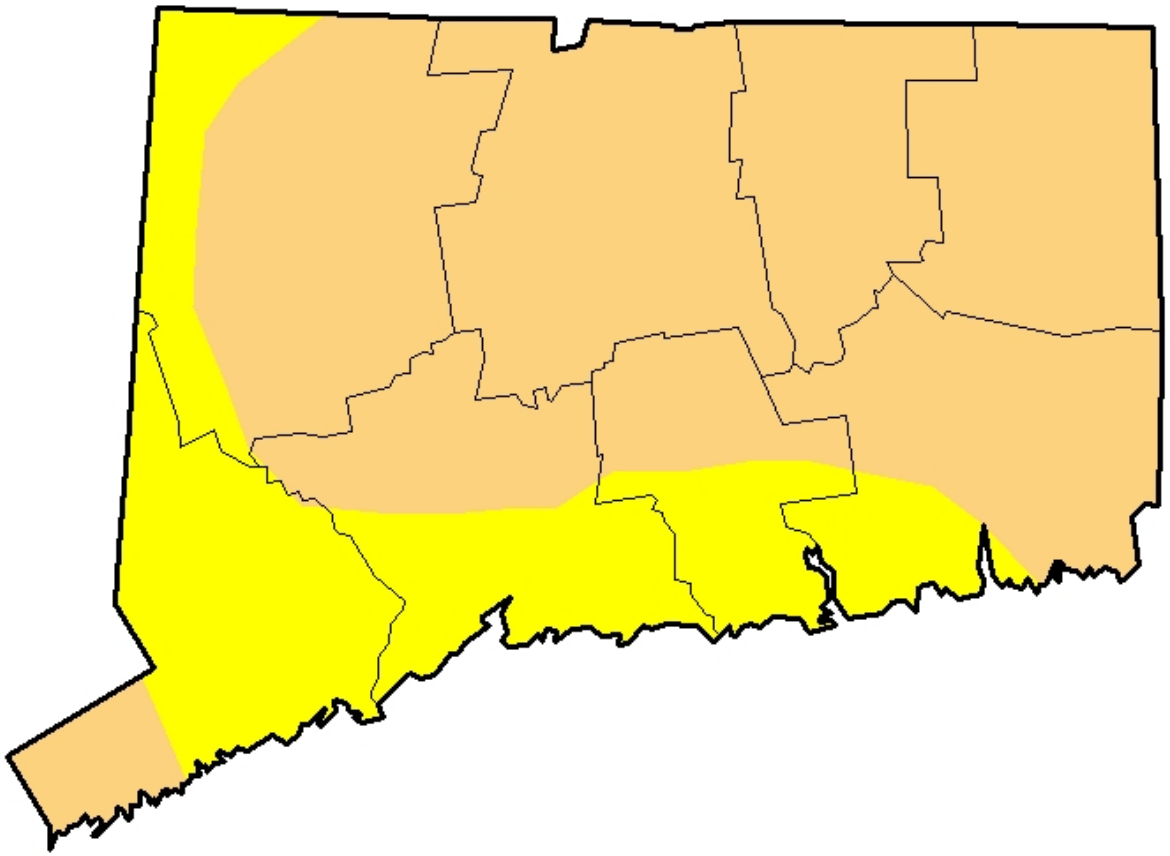
U.S. Drought Monitor

Conecticut

July 19, 2016

(Released Thursday, Jul. 21, 2016)

Valid 8 a.m. EDT



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The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

Chris Fenimore
NCEI/NESDIS/NOAA

http://droughtmonitor.unl.edu/

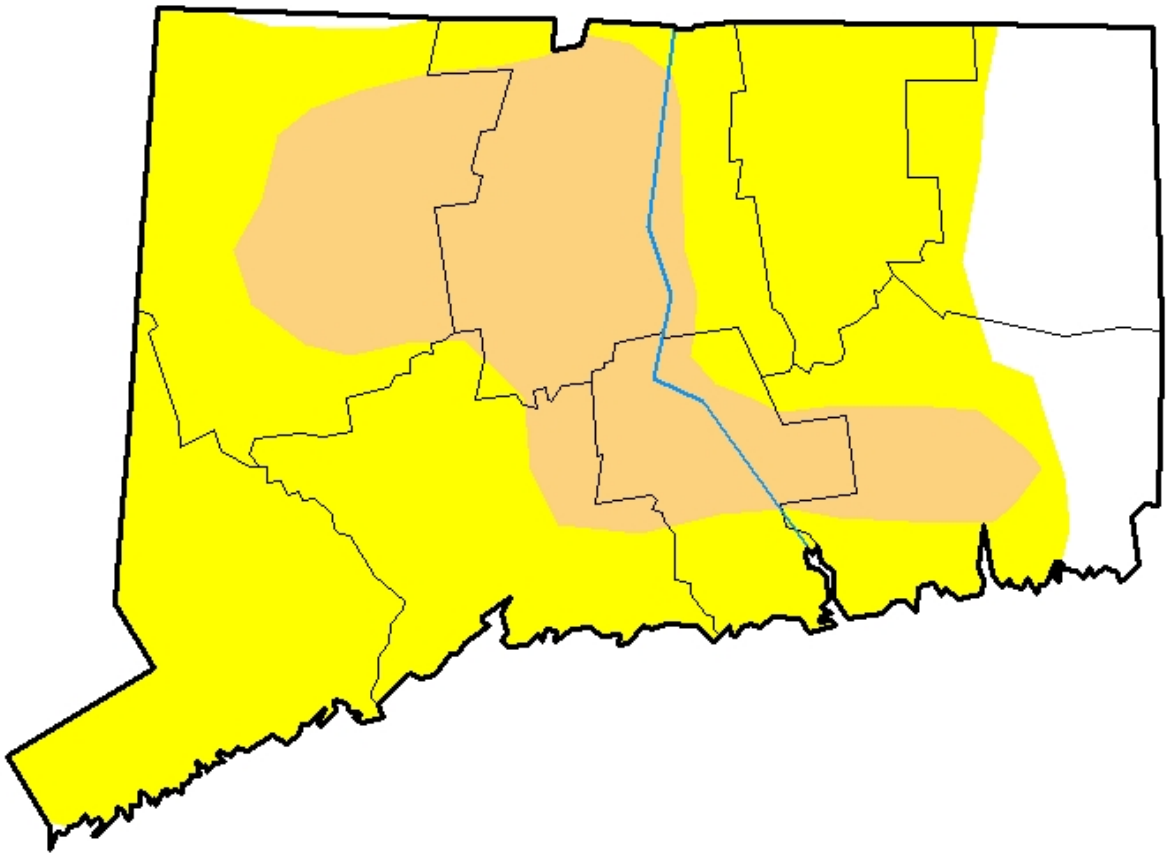
U.S. Drought Monitor

Connecticut

April 25, 2017

(Released Thursday, Apr. 27, 2017)

Valid 8 a.m. EDT



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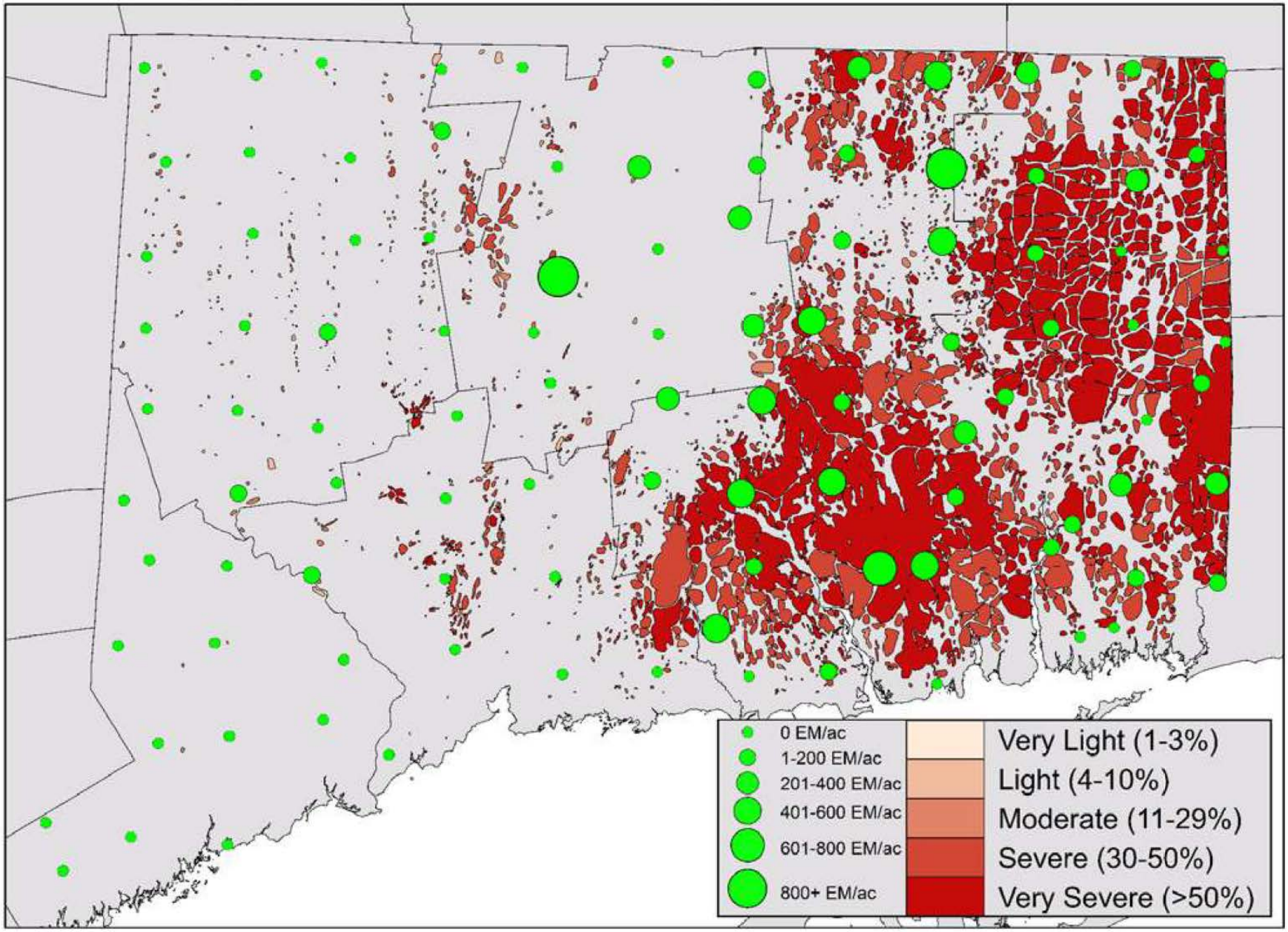
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

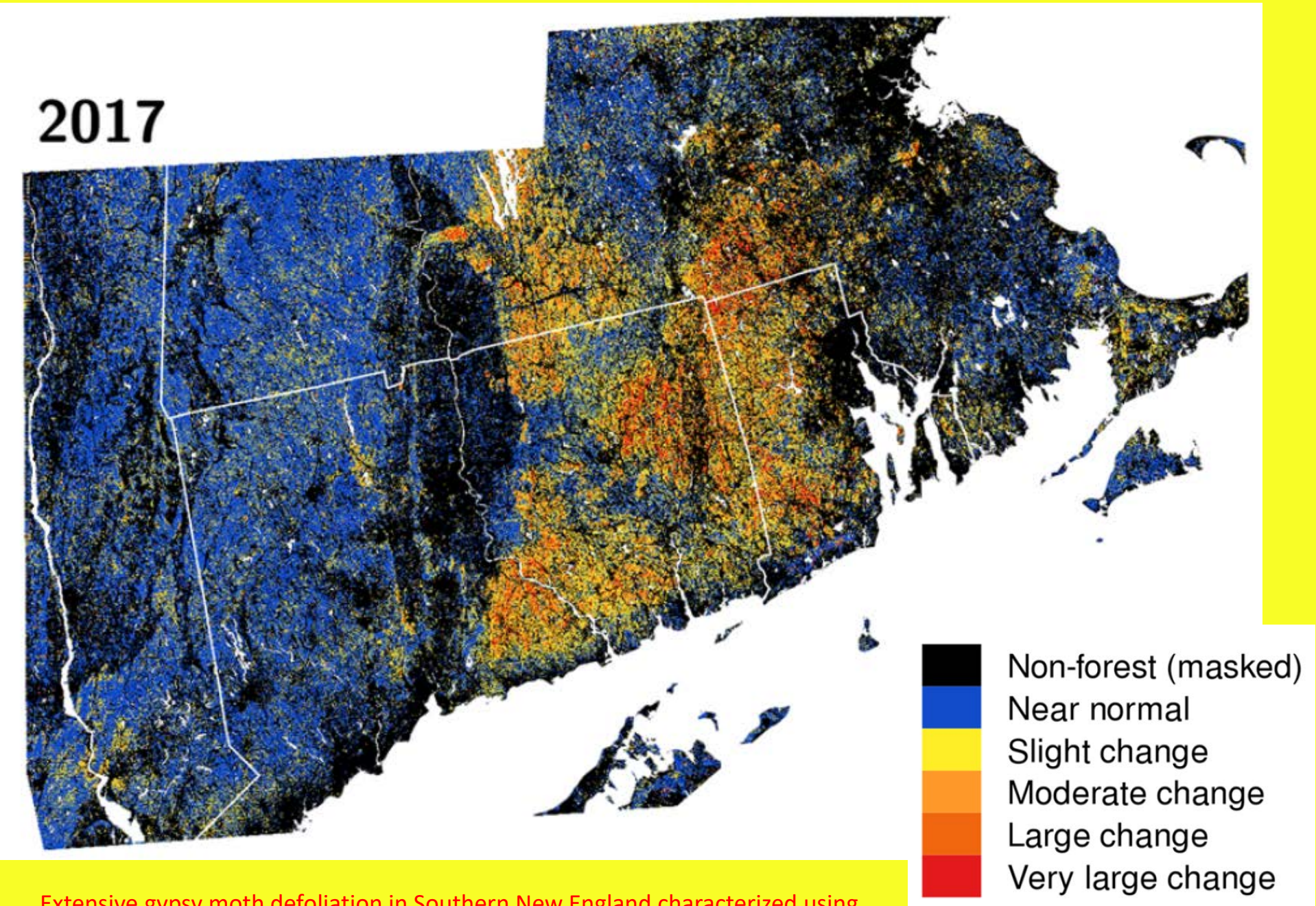
Author:

Eric Luebehusen
U.S. Department of Agriculture

http://droughtmonitor.unl.edu/

2017-2018 Gypsy Moth Egg Mass 7-Mile Grid Survey Results





Extensive gypsy moth defoliation in Southern New England characterized using Landsat satellite observations - Biol Invasions (2018) 20:3047–3053

THE LEGACY

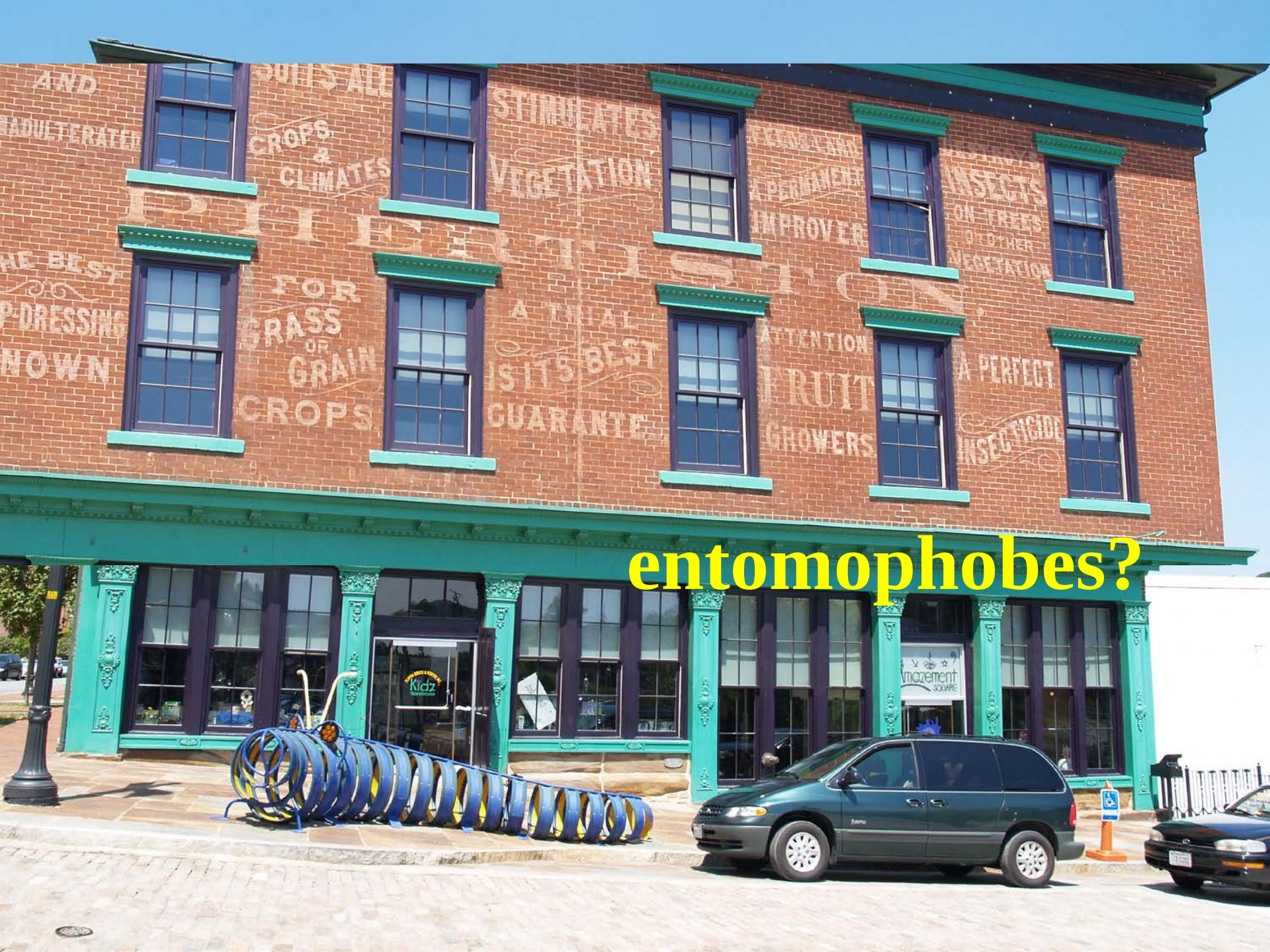
OF

THE SPONGY MOTH

OLD TIME SPRAY PROGRAM

- Heavily weighted towards chemicals
- Elimination of pest often sought as goal
- Pest more often the focus of the effort, rather than the plant
- Prescriptive sprays, often planned well in advance of growing season
- Volume oriented spraying (with price determined by amount sprayed, and spray amounts consistent year to year)
- Spraying often viewed independently of other tree care activities


"DEATH TO ALL INSECTS"


entomophobes?

GOALS ASSOCIATED WITH AN IPM PROGRAM

- Reduced Use of Pesticides
- Reduced Environmental Burdens (Ecologically)
- Reduced Environmental Burdens (Human Health)
- Healthy Trees
- Happy Customers
- Increased Awareness of Various Pest Control Options
- Educated Customers
- Educated Arborists
- For each Tree, all Tree Care Activities are considered together, as part of a unified goal.
- IPM = Intelligent Pest Management

What Sharon Douglas said:

Rake and remove fallen leaves; prune and remove infected limbs or tips; maintain vigor by fertilizing or watering; select resistant cultivars; fungicide sprays can be applied at budbreak and repeated at label intervals until leaves are fully expanded

What Spray Guy heard:

blah, blah, blah; blah, blah, blah; blah, blah, blah; blah, blah, blah; ***fungicide sprays can be applied;****blah, blah, blah; blah, blah, blah; blah, blah, blah; blah, blah, blah*

Why do we treat trees?

Do trees really need the help?

What’s wrong with the tree?

What’s right with the tree?

What Does a Healthy Tree Do???

Photosynthesis

Carbon Dioxide + Water → Oxygen + Sugar

energy in = sunlight

Photosynthesis

Carbon Dioxide + Water ➔ Oxygen + Sugar

energy in = sunlight

Respiration

Oxygen + Sugar ➔ Carbon Dioxide + Water

energy out = metabolism

Trees photosynthesize to produce sugars. Sugars are both a fuel and a building block. (Trees have a bank account!!!)

What the tree uses its sugars for:

- ***energy***

What the tree uses its sugars for:

- ***energy***
- ***growth***

What the tree uses its sugars for:

- *energy*
- *growth*
- *tissue repair/replacement*

What the tree uses its sugars for:

- *energy*
- *growth*
- *tissue repair/replacement*
- *wound response (compartmentalization)*

What the tree uses its sugars for:

- *energy*
- *growth*
- *tissue repair/replacement*
- *wound response (compartmentalizing)*
- *sex, including flowers and fruit*

What the tree uses its sugars for:

- *energy*
- *growth*
- *tissue repair/replacement*
- *wound response (compartmentalizing)*
- *sex, including flowers and fruit*
- *self-protection*

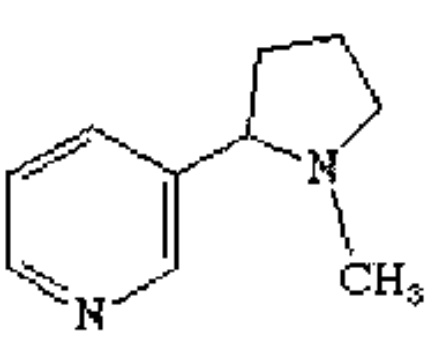
Self-Protection:

- *physical protection: waxes, hairs, bark*

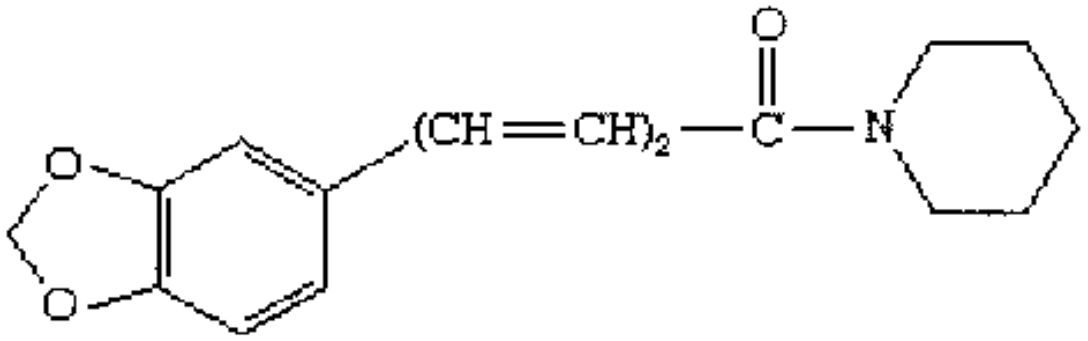
Self-Protection:

- *chemical protection*

e.g. pharmaceuticals



nicotine



piperine

Self-Protection:

- *compartmentalization*

(trees also compartmentalize to retain structural integrity)

Important Points:

Trees have a Budget!

Self-Protection is Expensive!!

Only Healthy Trees do it well.

Tree Strategy:

The

Bend, Don't Break

Approach

To Pests

All Trees Have Many Different Pests That May Harm It


UGA1326221

Balance of Nature

Balance of Nature

No pests means no lady bugs - the tree is defenseless should a pest come along.

The tree relies on the ladybugs to keep the aphids in check.

Balance of Nature

The web of life is very large and complex.

Some of Your Friends in the Arthropod World:

- *Assassin Bug*
- *Wolf Spider*
- *Stiletto Fly*
- *Aphid Lion*
- *Twice Stabbed Lady Beetle*
- *Fiery Hunter*
- *Robber Fly*
- *Minute Pirate Bug*
- *Preying Mantis*

Your Friend

Two Things:

- Trees need some degree of insects and diseases to toughen them up
- "Good Looks" are not particularly important to a tree

Imbalance in Nature

The Asian Longhorned Beetle

Worcester MA - Before

Worcester MA - After

The Asian Longhorned Beetle

Emerald Ash Borer

A Great Video on Arboricultural History – including the role pests, pesticides and how pest have been treated over the years:

The Legends of Arboriculture

Can be found on the following web page:

https://www.isa-arbor.com/Who-We-Are/Our-Organization/Our-History

Summary Points:

- *In native system, trees, pests and predators all co-evolved*
- *Non-native species and, especially, invasive exotics are special cases*
- *Condition of the tree often a key factor*
- *Timing is also a key factor*
  - *Pest life cycle*
  - *Growth stage and part of tree*
  - *Influence of weather*