

Are Plant Pathogens Causing Salt Marsh Dieback?

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**The Connecticut Agricultural Experiment
Station**



Did you know that salt marshes:

- Are the most productive ecosystems in New England.**
- Most fish and shell fish spend part of their life cycle protected in a salt marsh.**

Did you know that salt marshes:

- Are home to numerous bird species.**
- Filter toxins and absorb tons of nitrogen from inland rivers**
- Protect coastline against storm surges and wave energy**

Salt marsh dieback was first noticed on Cape Cod and along Long Island Sound in 2002.

The cause was unknown!!



Hammonasett State Park 2006

Low Marsh dieback Cape Cod 2006



What is salt marsh dieback?

**It is a sudden loss of salt
marsh grasses mainly
Spartina alterniflora, *S.*
patens, and *Distichilis spicata*.**

What is salt marsh dieback?

Areas that are affected do not recover even after several years.

What is salt marsh dieback?

**Salt marsh dieback is not
caused by wrack accumulation**

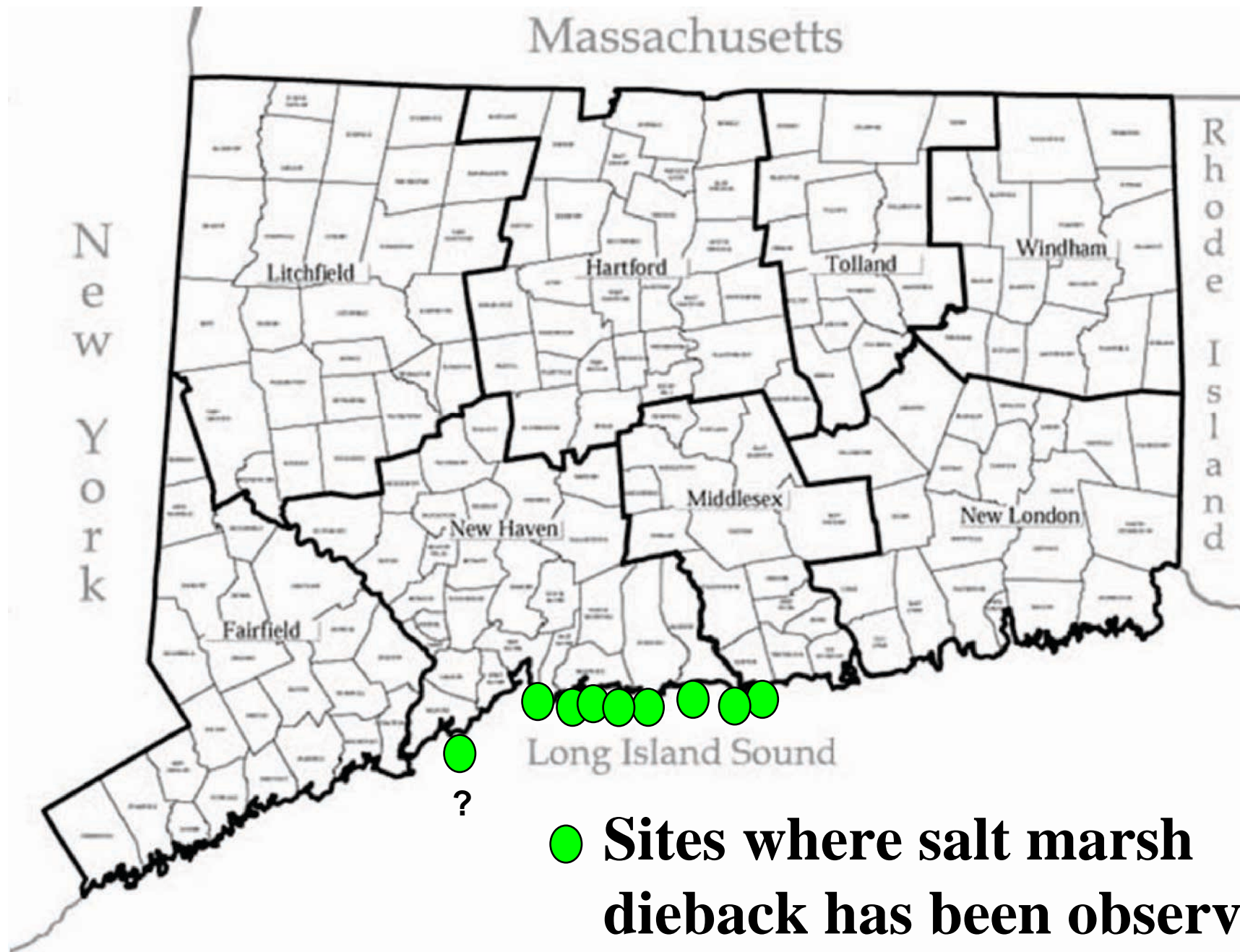
Wrack



What is salt marsh dieback?

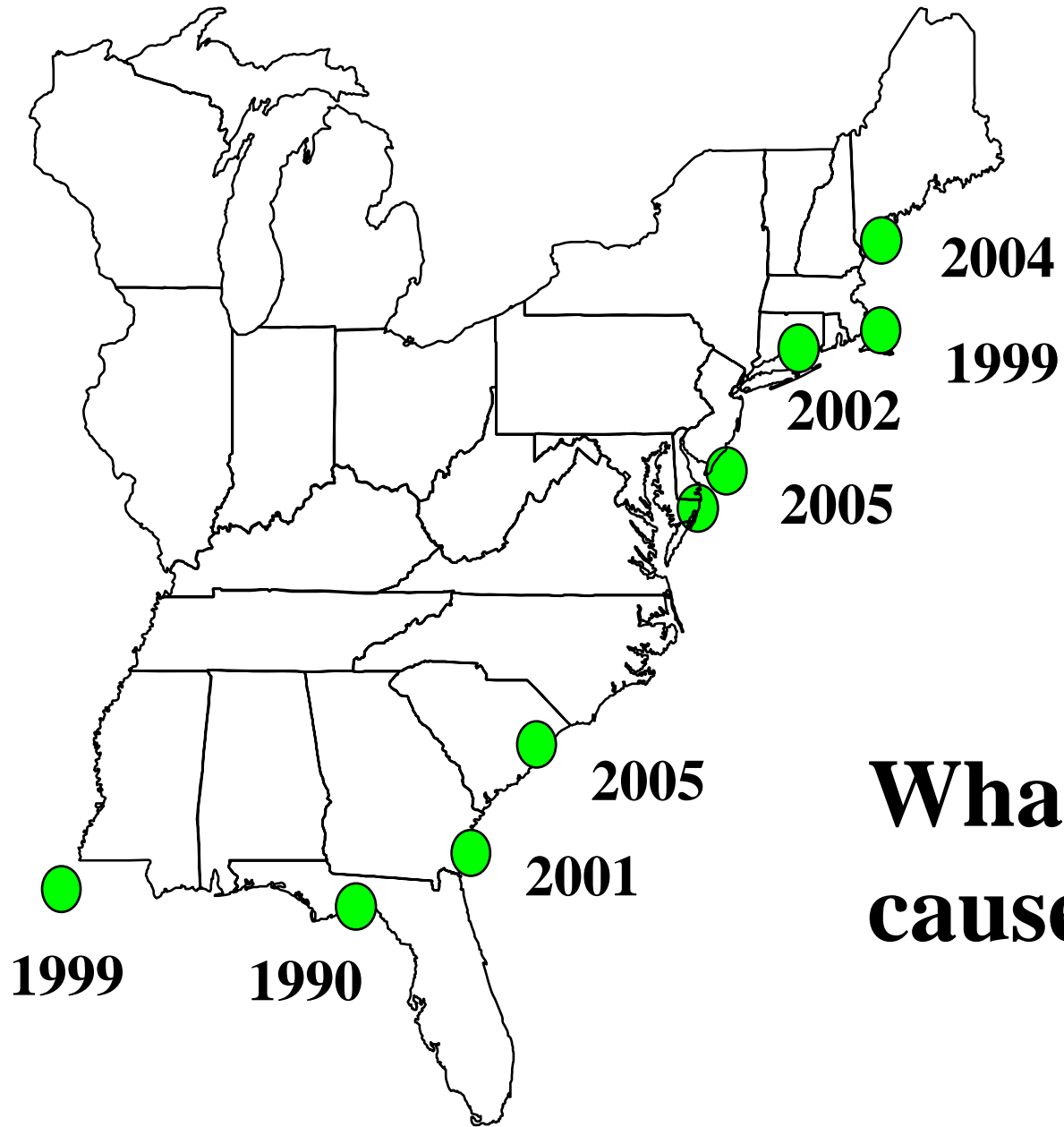
**Salt marsh dieback is not
caused by goose feeding,
submergence, or subsidence.**

**Does the dieback occur
everywhere along
Connecticut's Long Island
Sound?**



● Sites where salt marsh dieback has been observed.

**Does salt marsh dieback occur
any place other than Long
Island Sound and Cape Cod?**



Reported sites for SWD

What is the initial
cause of the dieback?

Sea Levels Boston Harbor

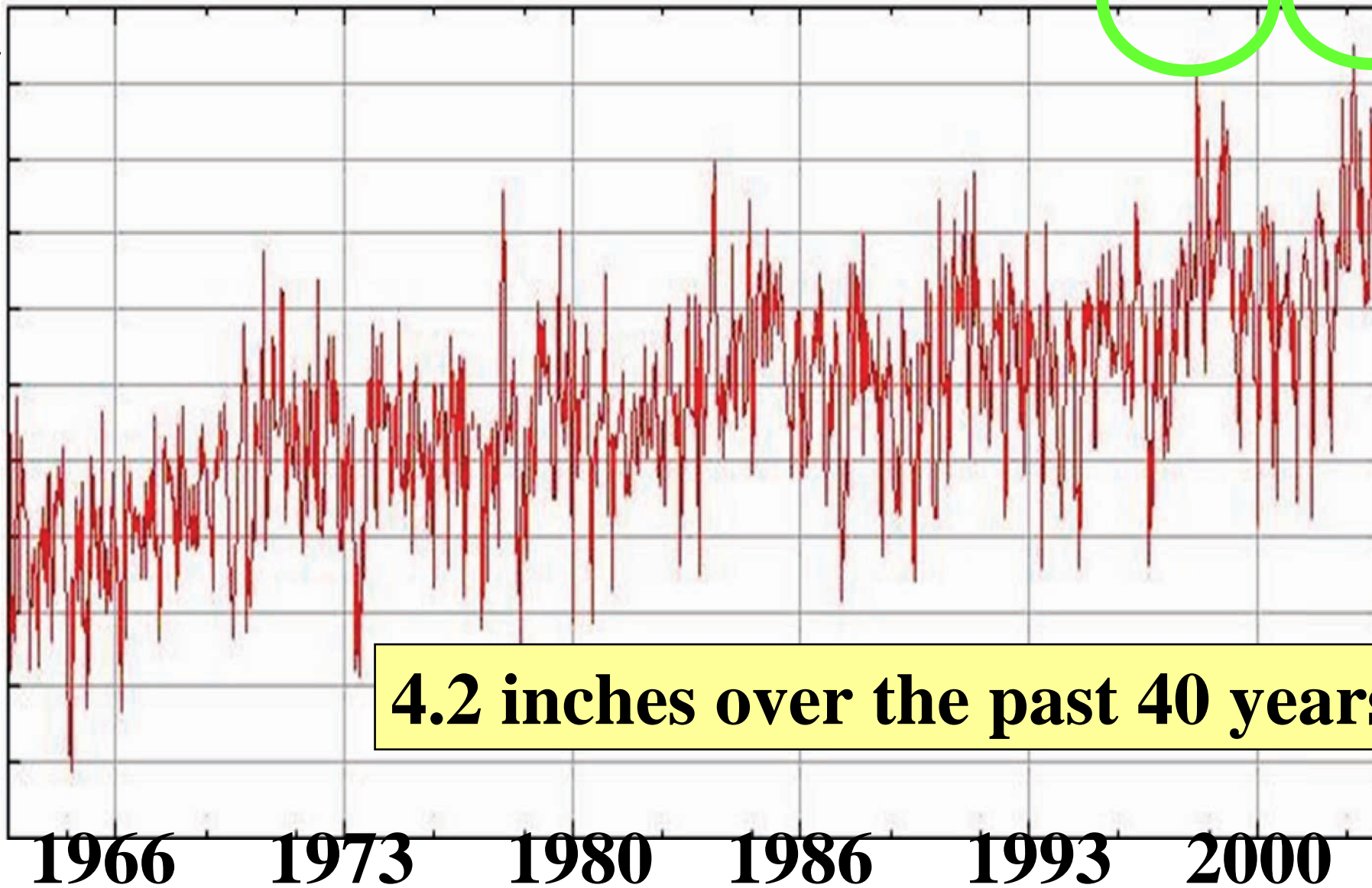
1999

2002

10.7

Ft

9.2



4.2 inches over the past 40 years

1966

1973

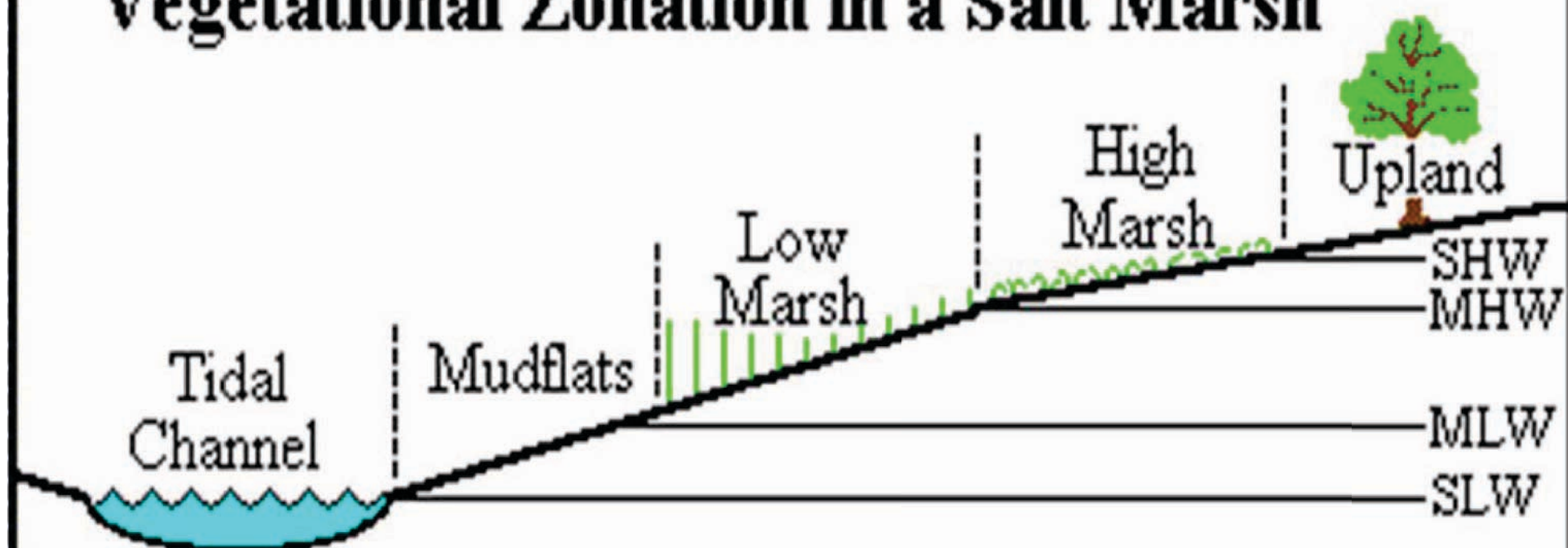
1980

1986

1993

2000

Vegetational Zonation in a Salt Marsh



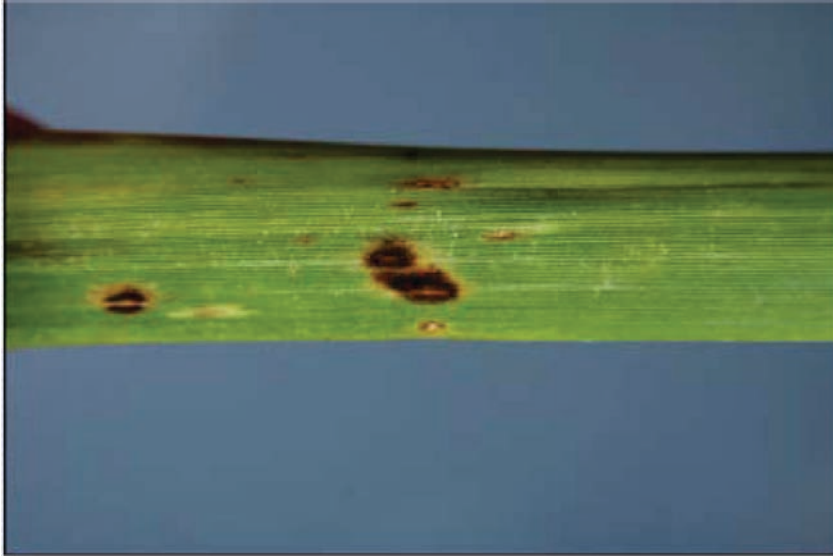
Low Marsh:
Spartina alterniflora
High Marsh:
Spartina patens
Distichlis spicata

SLW - Spring Low Water
MLW - Mean Low Water
MHW - Mean High Water
SHW - Spring High Water



In Louisiana

**A black leaf spot and
internal stem rot was
found on dying *Spartina*.**

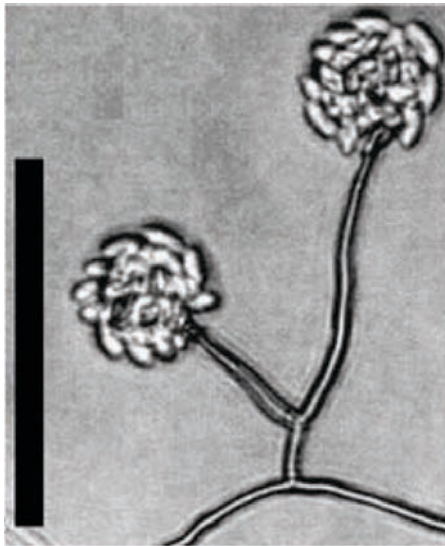


***Fusarium* spp were
isolated.**



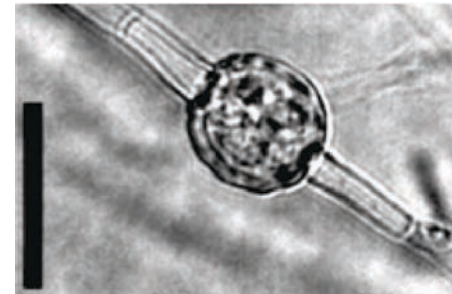
Fusarium

**An asexual fungus
Some species have a
sexual stage, but most do
not**



Microconidia

Chlamydospore



Macroconidia

Fusarium Diseases



In Connecticut, many leaf lesions were observed in dieback areas.





**Leaf
pieces**

Fusarium colonies

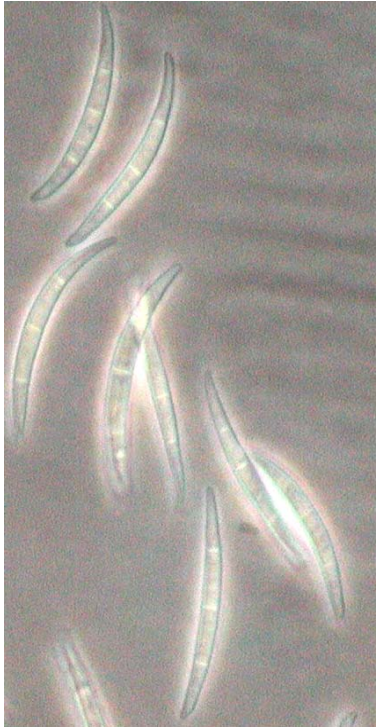
***Fusarium* was found more often in dieback areas than healthy marshes**



**Healthy
marsh**

Affected by salt marsh dieback

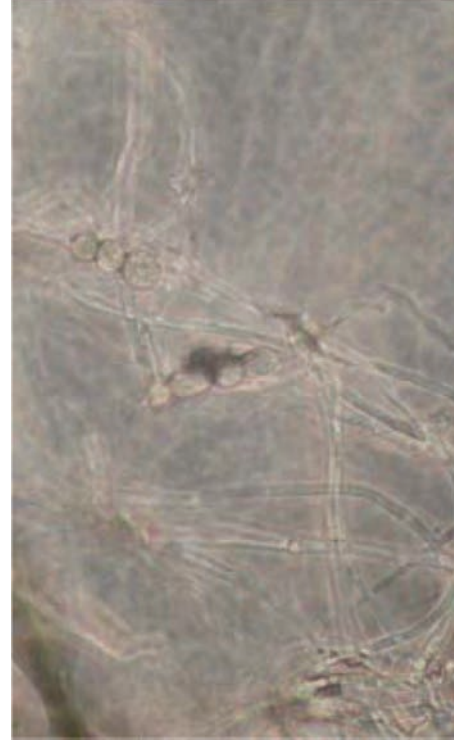
In Connecticut & Massachusetts (82 isolates)



1



2



4



6

Morphospecies

Spartina propagation



Pathogenicity tests



Pathogenicity tests



One Month later



Reisolation on selective media

Controls

Test



Reaction Types



Mild

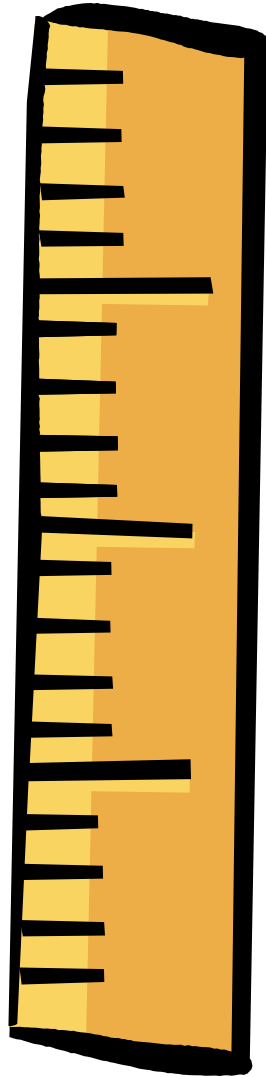


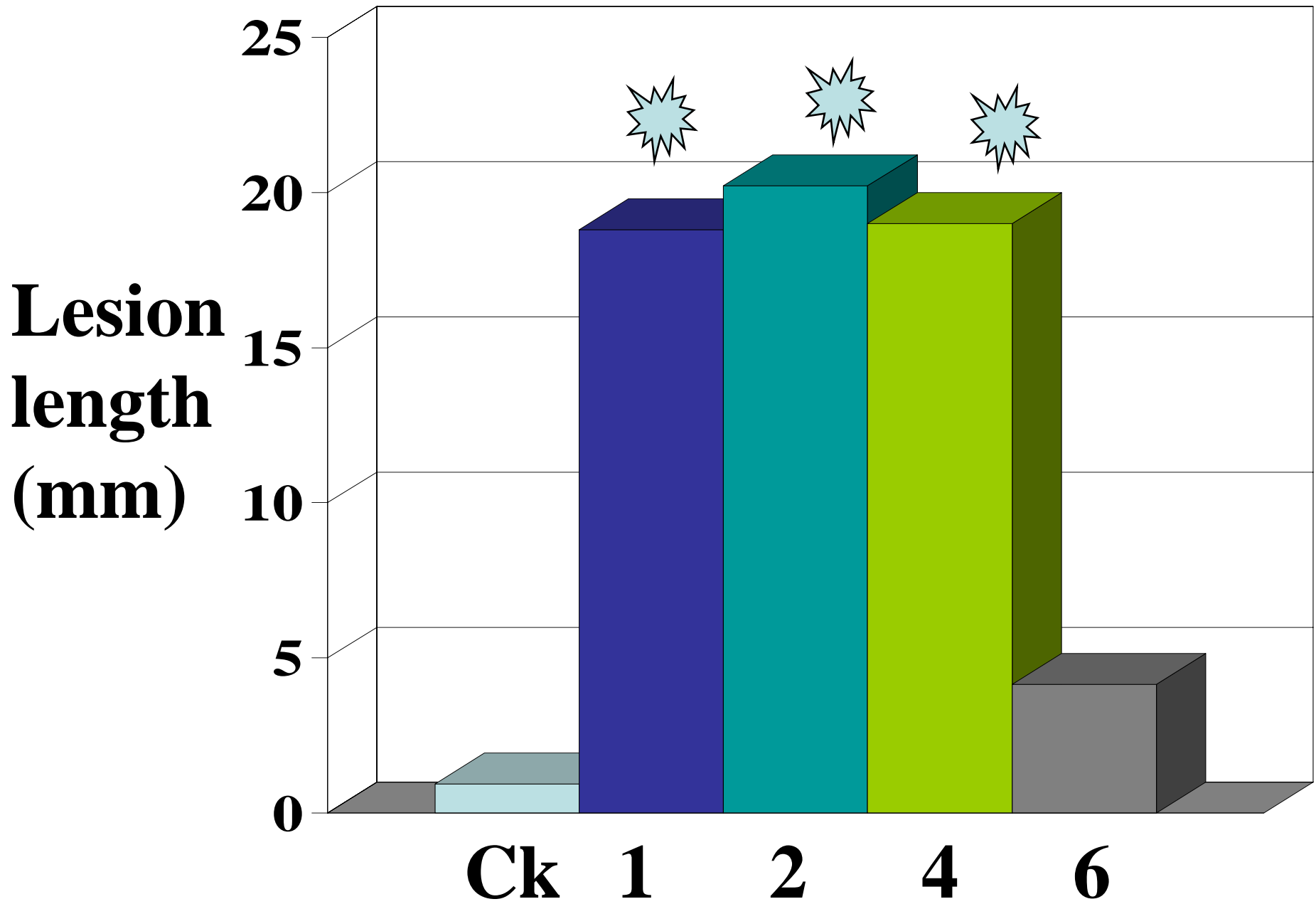
Moderate



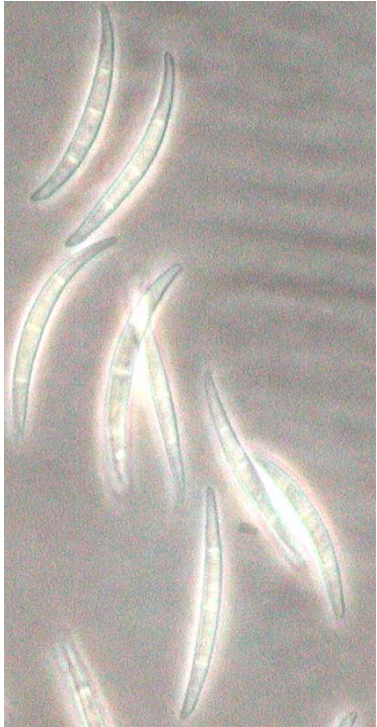
Severe

Lesion length (mm)





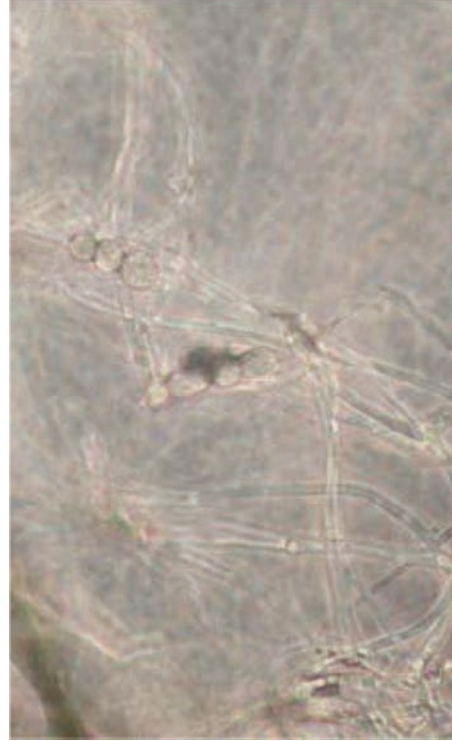
In Connecticut & Massachusetts



1



2



4



6

Morphospecies



Root Knot Nematode

**Does it interact
with fusarium?**



Summary

Are plant pathogens causing salt marsh dieback?

No! However, they may be impacting the ability of *Spartina alterniflora* to recolonize dieback sites.

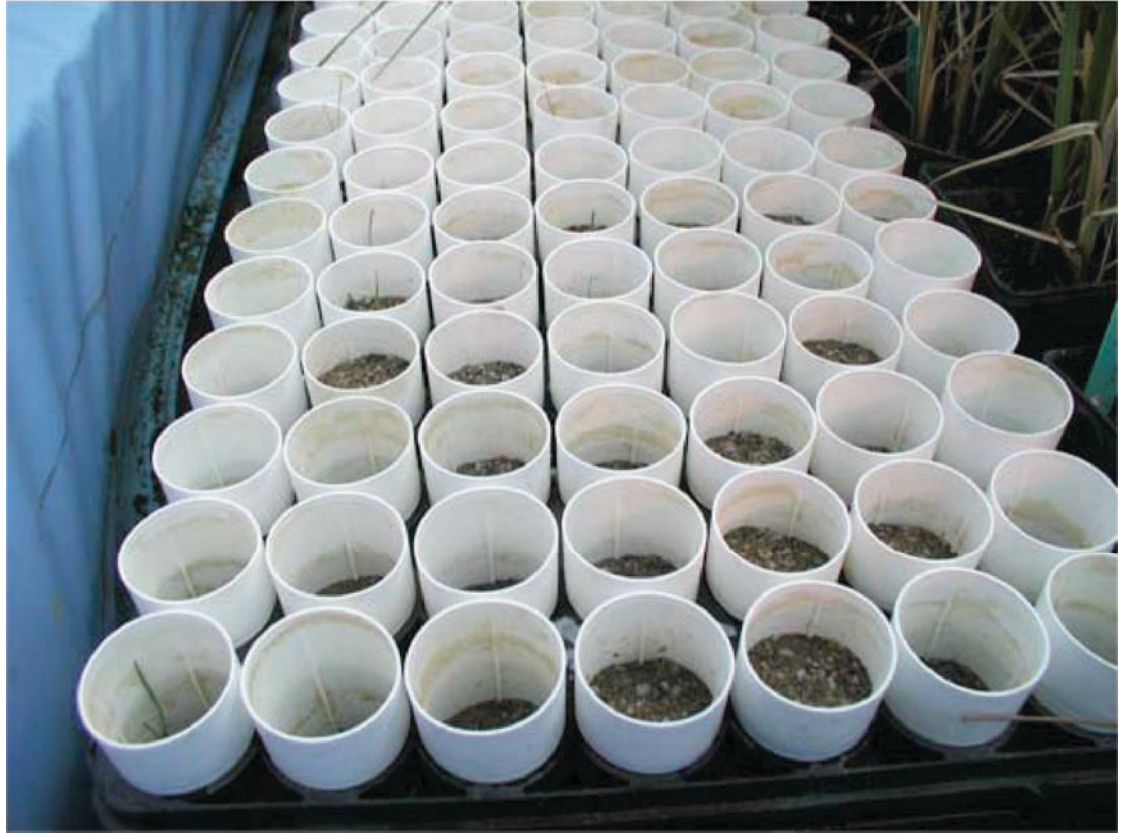
Experiments in progress

Root inoculations



Experiments in progress

**Developing a
seedling assay.**



Experiments in progress

Set up field
plots at
Hammonasset
State Park



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