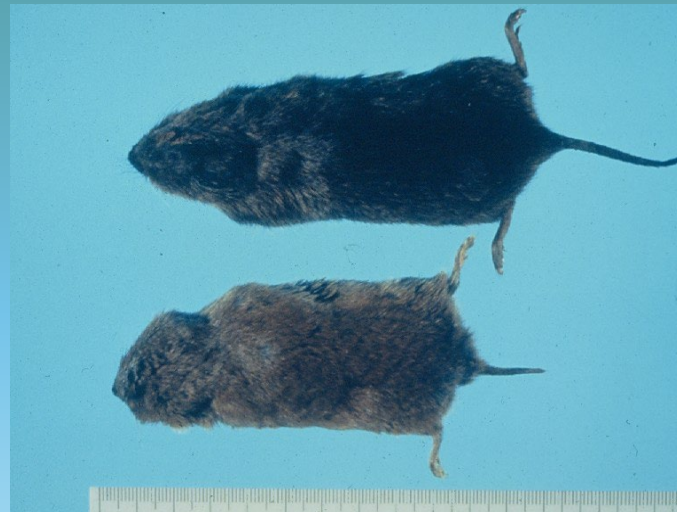


**The Integrated Pest Management (IPM)
Pesticide Safety Education (PSE)
Collaboration Team:**

Wildlife Damage Management Webinar Series

***A look under the hood
and what's around the corner***



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Search...



Wildlife Damage Management

National Pesticide Safety Education Month (+)

How to Read the Label

Calibration (+)

Disposal (+)

Drift (+)

Handling Pesticide Containers (+)

Homeowner (+)

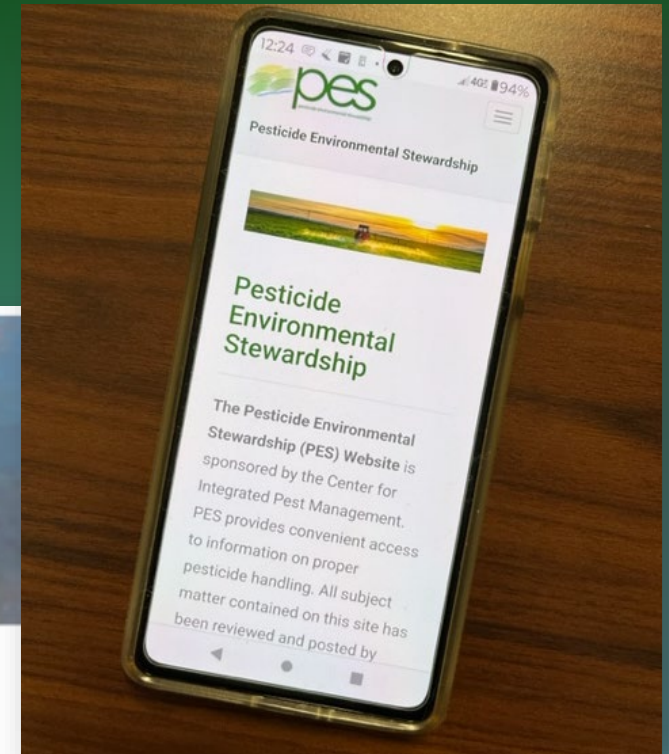
Integrated Pest Management (+)

Pesticides in Organic Production (+)

OSHA HazCom

Squirrels, raccoons, foxes and other wildlife fascinate us. We watch them, provide habitat, and feed them—both intentionally and unintentionally. However, wildlife can also damage property, be a nuisance, and pose threats to human health and safety thus demonstrating a clear need for safe and effective management. This module will help you manage wildlife problems by developing solutions based on **integrated pest management (IPM)**. IPM focuses on long-term prevention of pest problems through a combination of techniques such as biological control, habitat manipulation, exclusion, removal, and use of resistant plant varieties. IPM for wildlife is called Integrated Wildlife Damage Management (IWDMM).

This site was prepared by the PES IPM Collaboration Team and funded in part by the United States Environmental Protection Agency under assistance agreement X8-83927401 to Michigan State University.



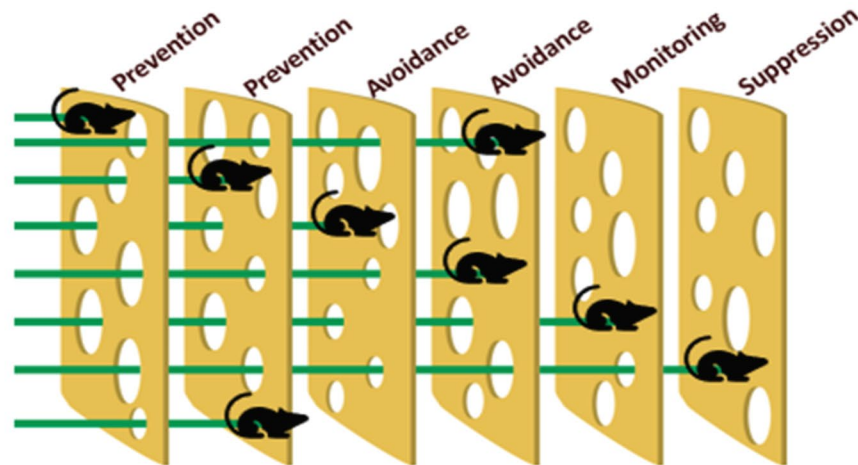
PAMS...

... Swiss cheese model

Integrated Wildlife Damage Management

Successful wildlife damage management relies on the knowledge and use of multiple tools or actions. The acronym, **PAMS**, which stands for **P**revention, **A**voidance, **M**onitoring and **S**uppression, is an easy way to remember the actions you can take in integrated wildlife damage management.

The "Swiss cheese" model below depicts a PAMS approach for mouse control. (Note: you may use different tactics so don't view this as standard practice.) The first two slices represent **prevention** tactics such as: 1.) sealing holes or cracks ($\frac{1}{4}$ in. or larger) to exclude mice from buildings, or 2.) installing brush-type door sweeps that block the gap between the threshold and door base. The two **avoidance** slices focus on making an area unattractive for mice, examples include: 1.) not allowing trash to accumulate directly outside the building, or 2.) moving trash bins further away from entrances. Regularly **monitor** areas mice are known to infest such as kitchens and pantries for signs of their presence (e.g., fecal pellets, seed and insect carcasses). Commercial pest managers may use non-toxic detection bait blocks or detect signs of gnawing on cardboard boxes. Snap traps, a common suppression tool, may be used for monitoring as well—catching one mouse may indicate that there are more. If further action is needed, **suppression** tactics such as an adequate number and arrangement of traps (e.g., twelve traps for 2-3 mice is not too many) should be used.



Redrawn from James Reasons' Swiss Cheese Model, sketchplanations.com/the-swiss-cheese-model.

Wildlife Damage Management Needs Assessment

The Problem:

Increased urbanization

+

Decline in familiarity with wildlife



Need for research-based WDM information



The (initial) Plan

Western IPM Center Grant

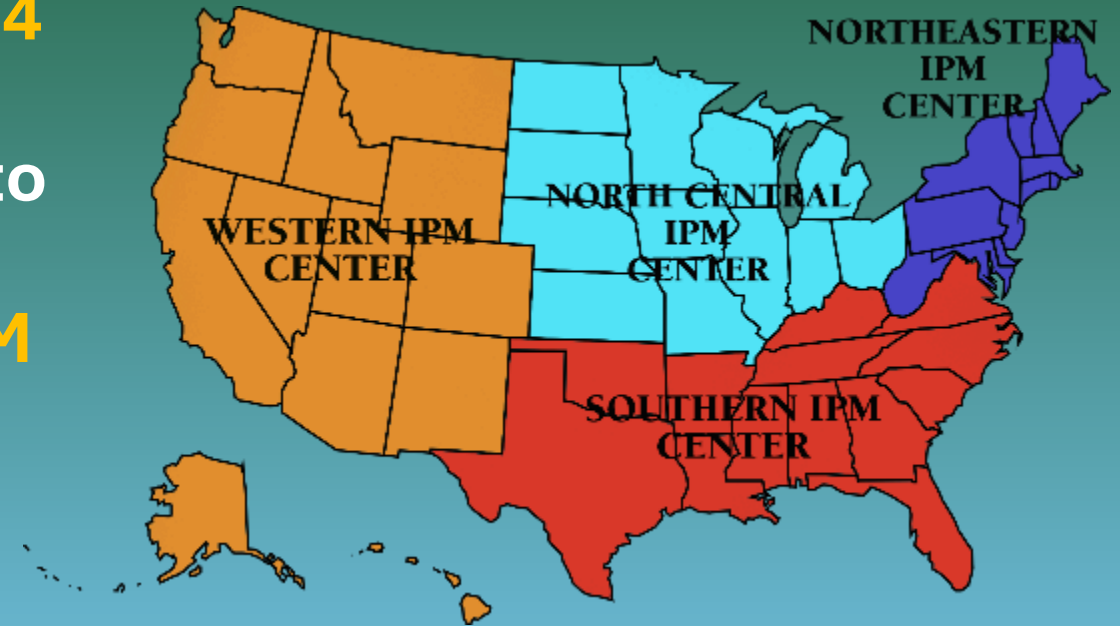
Survey Extension Educators

1. ID needs for Wildlife Damage Management training
2. ID the way(s) they wish to receive the training or information



Results

- ❑ **731** total responses were collected
- ❑ Collected data from **48** states and **4** territories.
- ❑ ~50% of respondents choose not to answer the location question
- ❑ Aggregated responses by the **4 IPM Regions:**
 - North Central
 - Northeastern
 - Southern
 - Western Region



Avg. number of WDM-related questions fielded per year:

- Homeowners or renters (48)
- Farmers (42)
- Wildlife-related professionals (36)

Compared with previous years, the number of questions are:

- Increasing (45%)
- Staying the same (52%)
- Decreasing (3%)



Top 5 Vertebrate Pests*



34 mentions



32 mentions



29 mentions



25 mentions



19 mentions

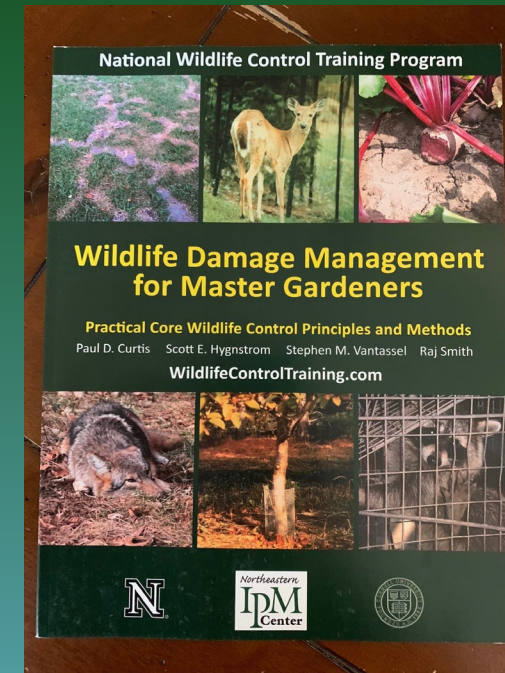
*** From data analyzed in the Western Region**

Sources used to find info on WDM conflicts:

1. Extension publications
2. Internet browser search
3. Wildlife agency (state or federal)
4. Extension Specialists

The preferred format of technical training:

1. Webinars (1-hour long)
2. Online courses (self-directed study)
3. In-person classes
4. Static resources only (e.g., website, fact sheets, etc.)



Beasts Begone! Handling Wildlife Problems in Buildings

by Lynn Braband, New York State
Integrated Pest Management Program



Dealing with Deer in Suburban Landscapes



Dr. Paul Curtis
Cornell University
Ithaca, NY

Deer Damage Management Methods

- Habitat Modification
- Exclusion Methods
- Frightening Methods
- Removal
- Fertility Control



Habitat Modification

- Plant selection



Exclusion

Netting



Fencing



Frightening Methods

- Auditory repellents
- Visual repellents
- Odor repellents
- Ultrasonic repellents



Deer Removal

- Hunting
- Drop-door traps
- Drop nets
- Darting
- Sharp-shooting



Fertility Control

- Immunocontraception
- Surgical sterilization



Problems Caused by Deer Overabundance



Deer-related Vehicle Accidents

- Potential reported number DRVAs nationwide in 1991 was 726,000
- Only 20% - 50% of the total number of DRVAs are actually reported
- Probable that at least 1.5 million DRVAs occur each year
- At an average cost of >\$3,500 per collision, this totals >\$5 billion/year



200+ Human Fatalities per Year



AROUND NEW YORK

Car-deer crash kills teen-ager

CANTON, N.Y. — A 15-year-old girl riding in the backseat of a van was killed when a deer crashed through the vehicle's windshield, striking her in the head. Misty Hanson of Canton died Wednesday of massive head injuries, authorities said.

"We have been saying right along that there are so many deer, there has to be something done," St. Lawrence County Sheriff Keith K. Knowlton said Thursday. "Deer are pretty in the woods and fields, but they are dangerous on the highways."

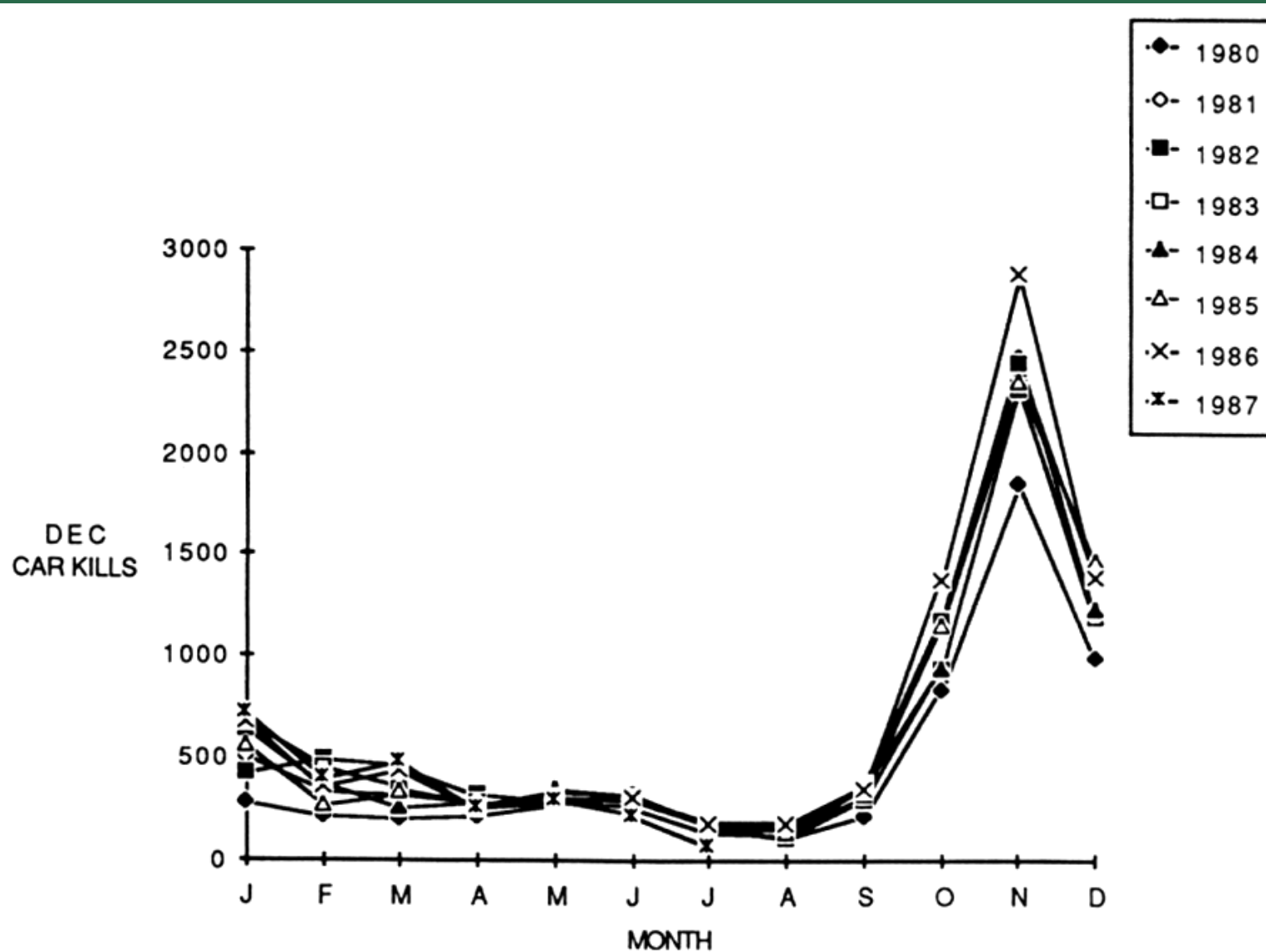
Police said the teen was riding with her family on Route 29 in the town of Pierrepont when the accident happened at about 5:15 p.m. The deer ran into the road and collided with a car driven by Rebecca J. Paul, 33, of Colton.



Ways to Reduce DRVAs

- Education for motorists is important
- Use extra caution while driving during Oct., Nov., and Dec.
- Be careful when driving at dawn or dusk
- Note areas with deer crossing signs and places where deer cross roads
- Scan the roadsides for eye reflections
- Manage herd density where possible

Seasonal Trends in DVCs





Reflector Devices

**...Mixed
Results**

Bells and Whistles

...Don't Work!



Tick-borne Diseases

- Number of reported tickborne disease cases in the U.S. more than doubled from 2004-2016
- Seven new pathogens were discovered or recognized in the U.S. as being able to infect people



*CDC Vital Signs: Trends in Reported Vectorborne Disease Cases — United States and Territories, 2004–2016 May 4, 2018 / 67(17);496–501

Ticks in NYS

~30 species of ticks are found in NYS

10 species commonly bite humans

4 species can potentially transmit diseases (in New York)

**Black-legged
(deer) tick**
*Ixodes
scapularis*



American Dog tick
*Dermacentor
variabilis*



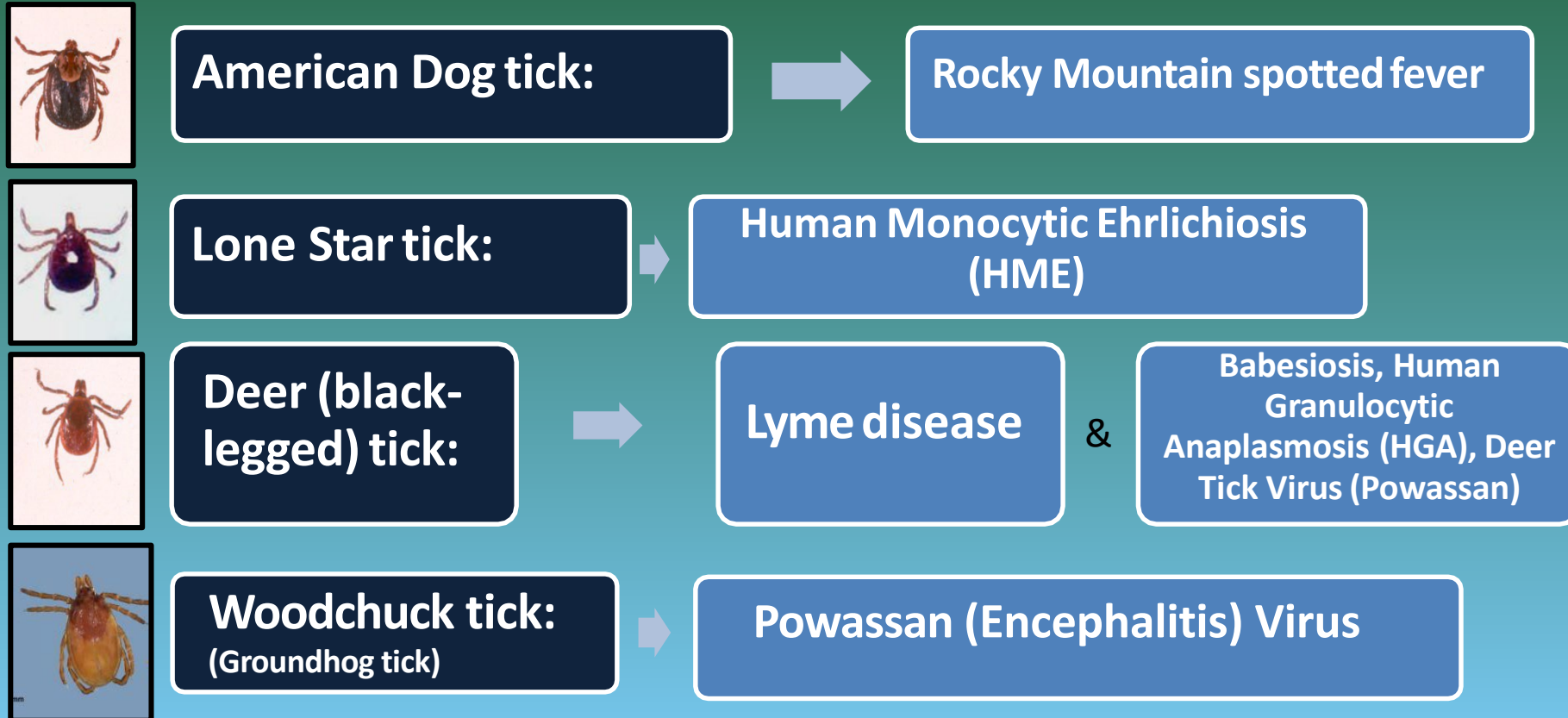
Lone Star tick
*Amblyomma
americanum*

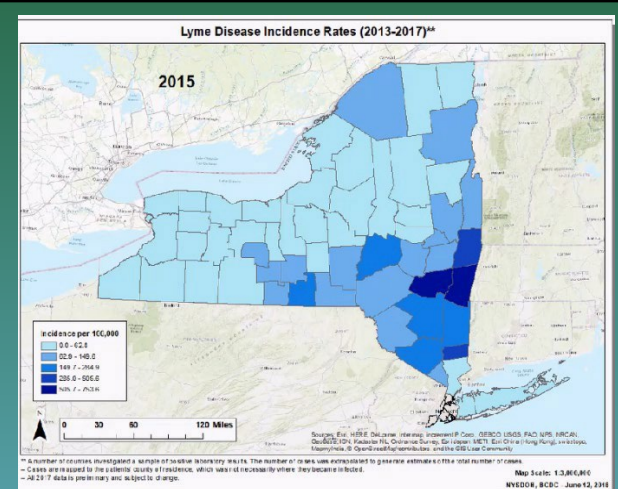
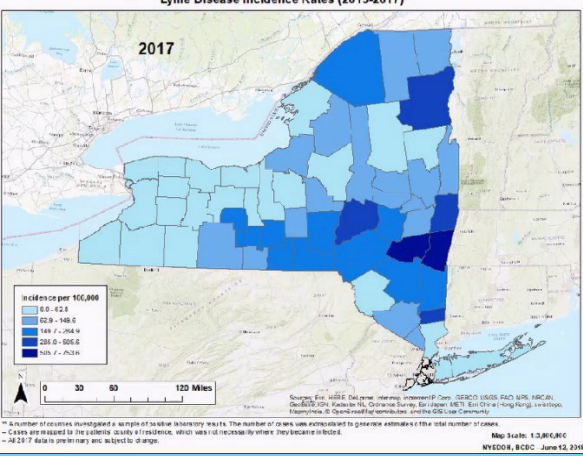
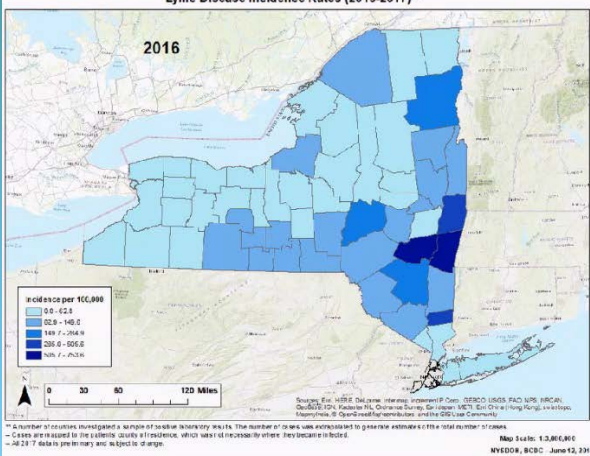


Woodchuck tick
Ixodes cookei



Tick-borne Disease Transmission



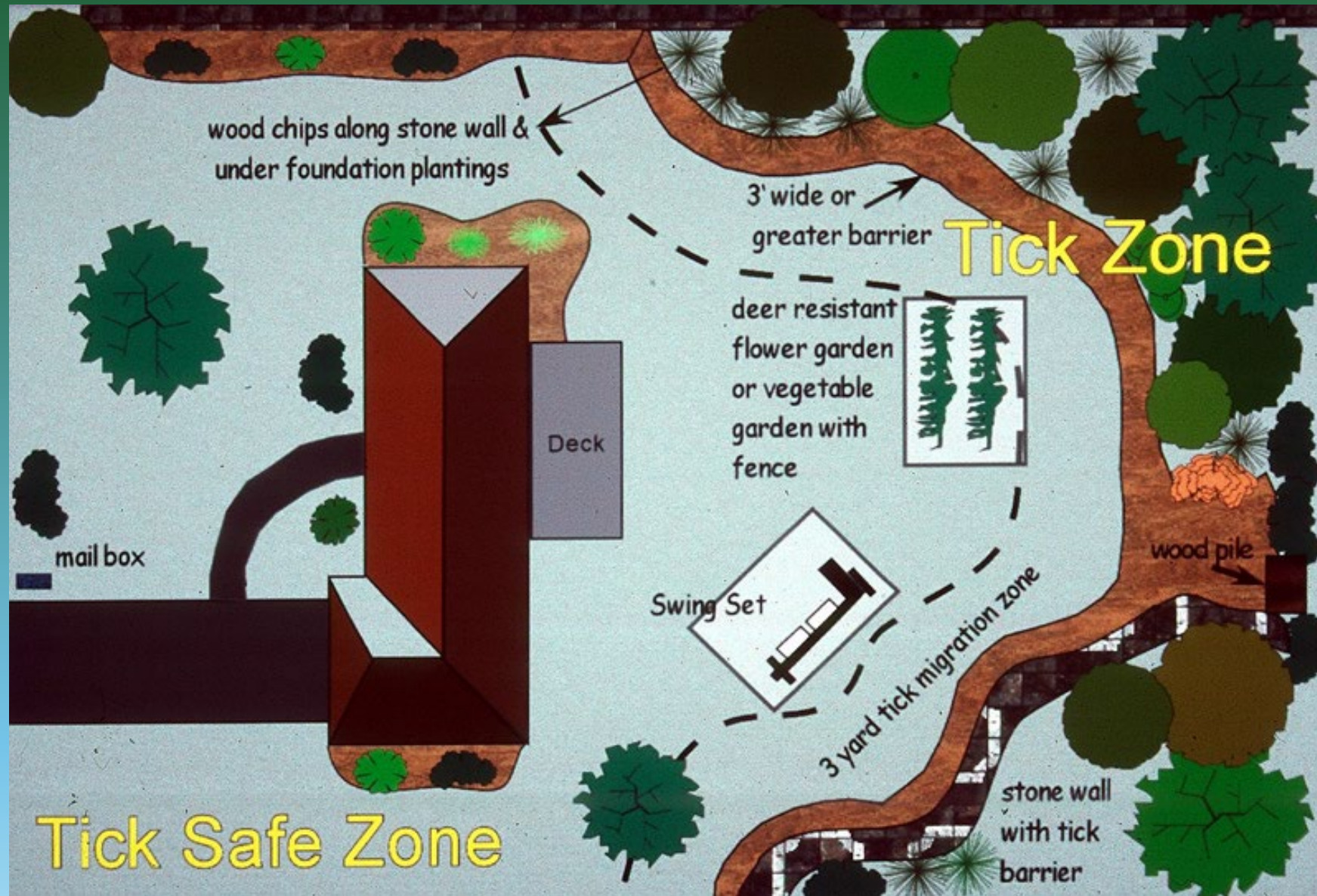


Managing Tick-borne Diseases

- Direct reductions in deer densities (??)
- Fencing to exclude deer from areas
- Self-application of acaricides to deer via feeding stations (4-Poster Device)
- Self-application of vaccines to mice via feeding stations (Lyme Shield Device)
- Landscaping practices



Create a Tick-Safe Zone

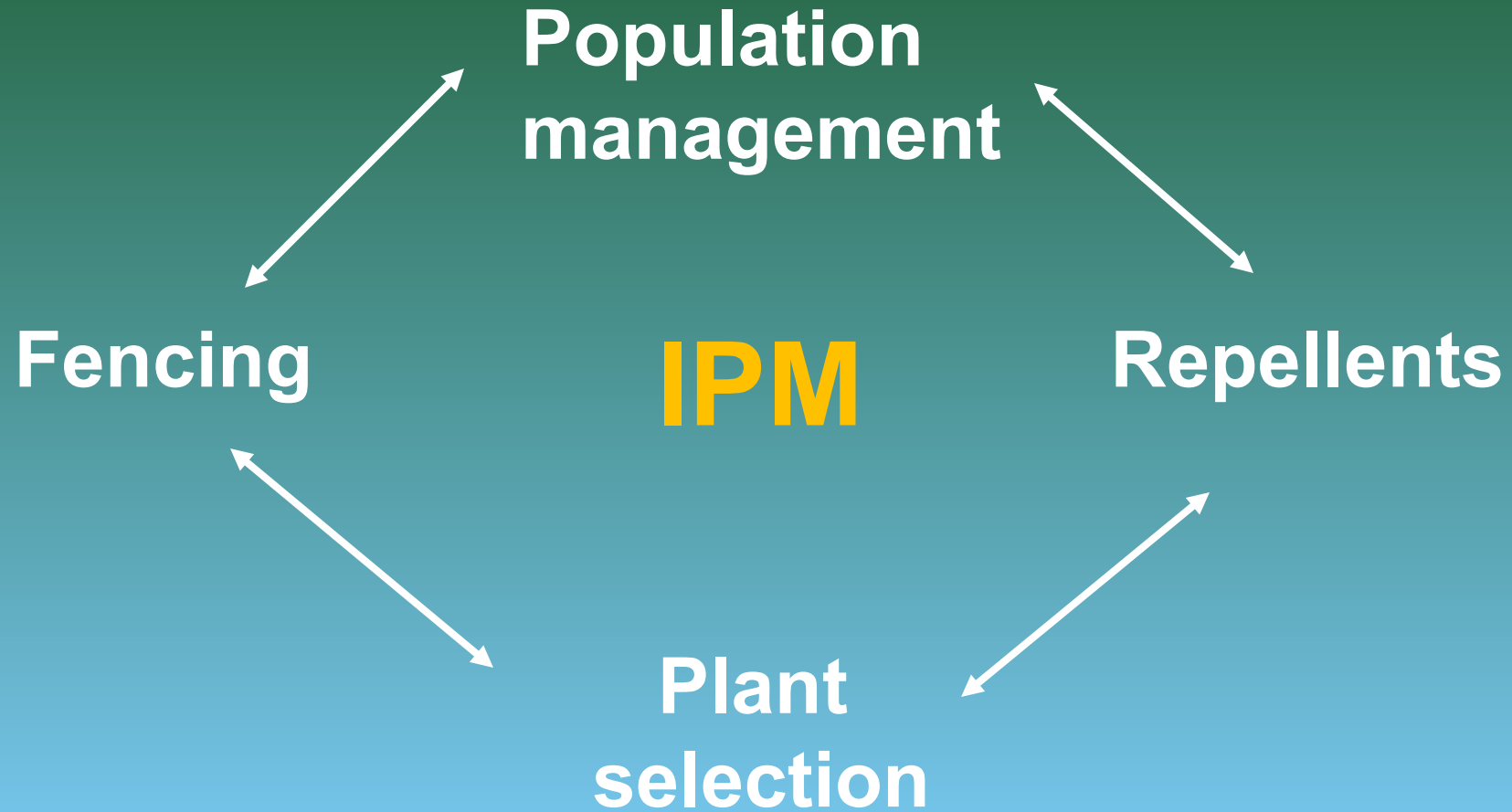


Landscape Plant Damage

- In 1995, 2.4 million U.S. homes impacted by deer costing > \$250 million annually
- Deer cost Westchester County residents \$6.5-9.5 million in 1987
- Average plant replacement costs were \$475/home with damage.
- Yews, rhododendron, and arborvitae most frequently damaged.

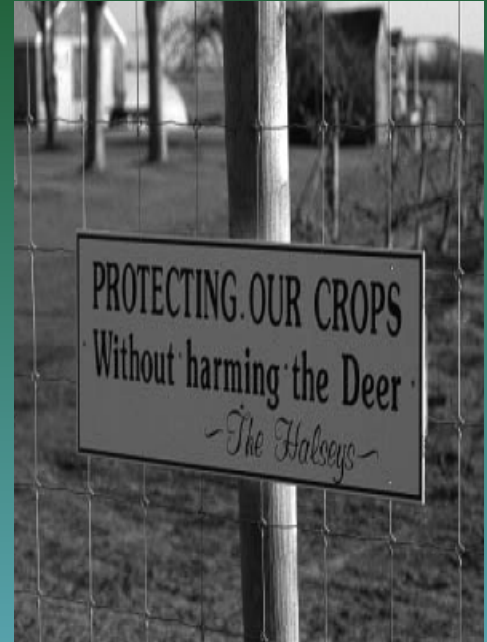


Deer Management Options



Reducing Plant Damage

- Repellents may work when deer pressure and damage is light
- Fencing provides reliable control when deer damage is moderate to heavy
- Manage herd density where possible
- Choose plants that are less attractive to deer
- Deer feeding is illegal in NYS



Deer Population Reductions

- Recreational hunting
- DMAP Permits
- Deer Damage Permits
- LCP Permits



Deer Exclusion Alternatives

- 8-foot barrier fences
- Individual plant protection
- Electric fences



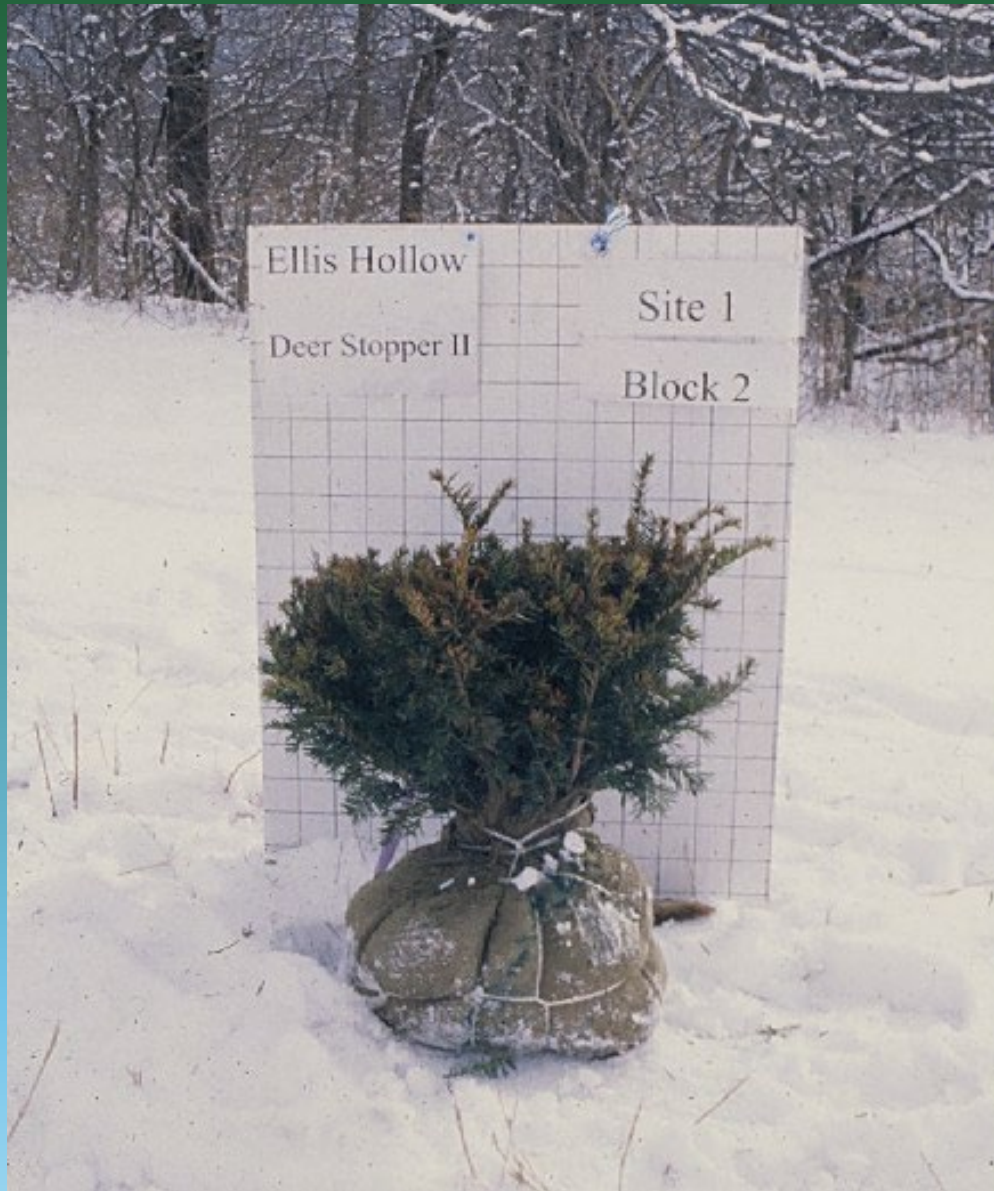


Deer Repellents

- BGR Deer-Away
- Hinder
- Deer-Off
- Chew-Not
- Bonide Rabbit/Deer Repellent
- Hot Sauce Repellent
- Tree Guard
- Spotrete-F

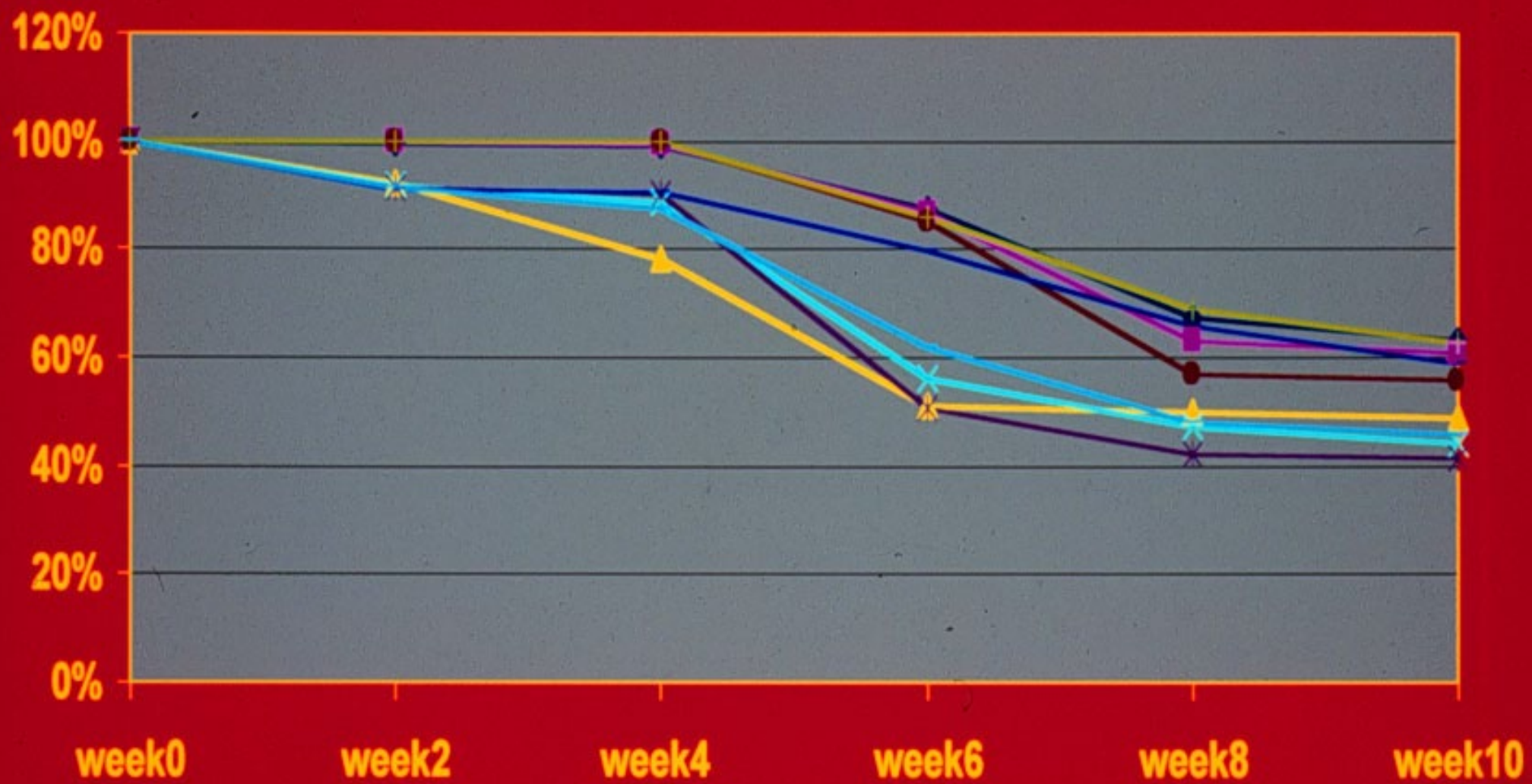


Testing Deer Repellents



Testing Deer Repellents



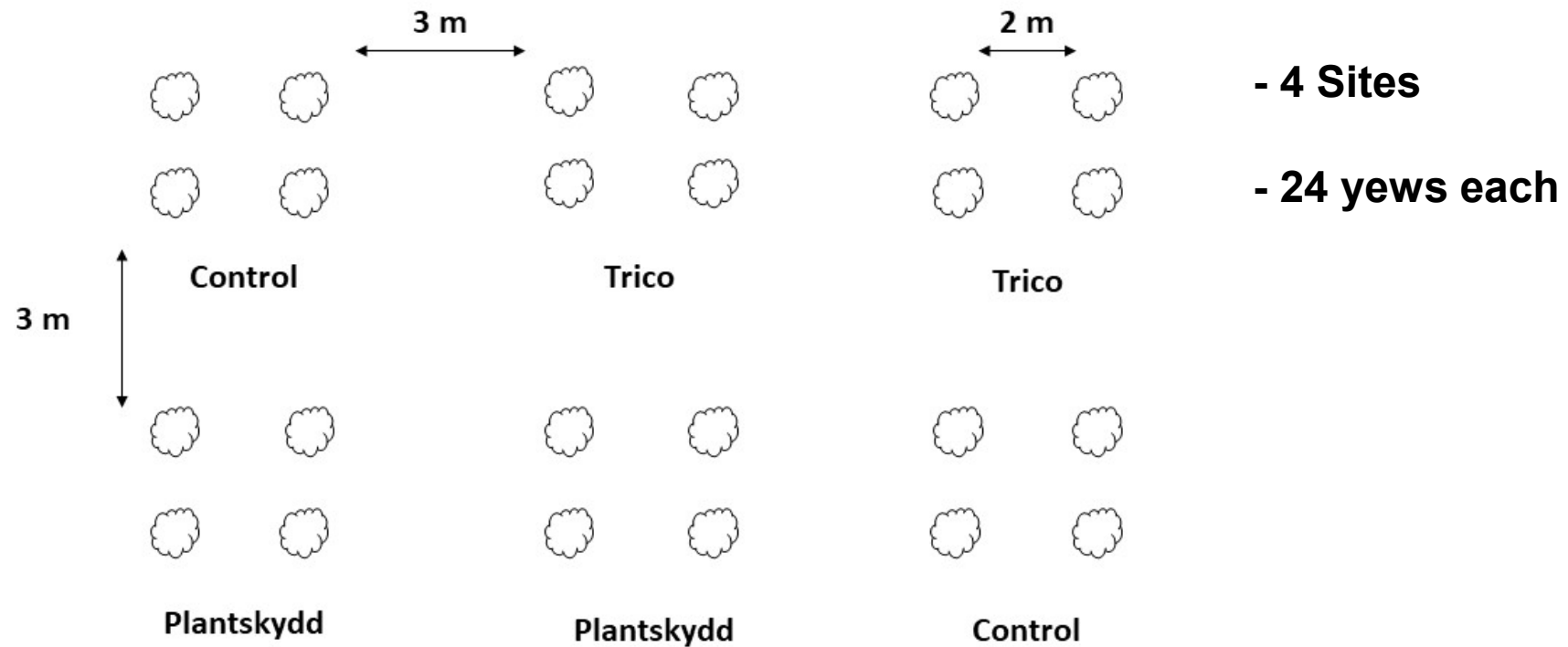


◆ BGR (Mix) ■ BGR (Spray) ▲ Control
✕ cu-a ✖ cu-b ● Deer Off
+ Deer Stopper II — Repellex — Tree Guard

TRICO Pro- A Novel Deer Repellent



Design for Repellent Trial





1/22/2021 5:20 AM

CUDNR105



Deer Damage Scores



Score 0



Score 1



Score 2



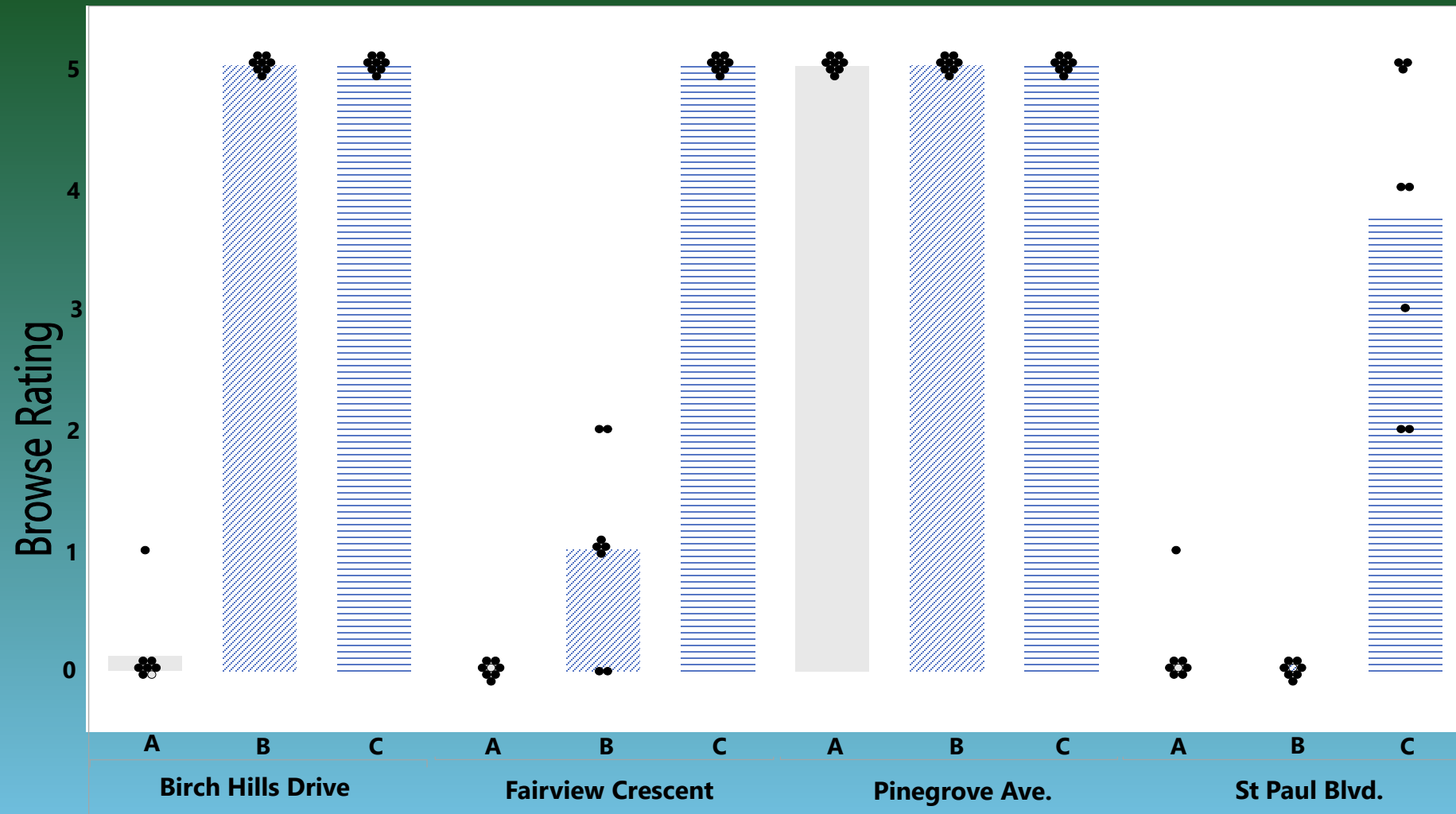
Score 3



Score 4



Score 5



A = Trico

B = Plantskydd

C = Control



Home-remedy Deer Repellents

**NONE OF THESE PRODUCTS CAN BE
RECOMMENDED BY EXTENSION STAFF**

- Human hair
- Soap bars
- Animal wastes
- Blood meal



Factors Influencing Deer Feeding Pressure

- Deer population density
- Food & cover sources
- Travel corridors
- Alternative foods
- Season & weather
- Deer nutrition
- Plant palatability & nutrients
- Previous experience



Northeastern Ornamentals Rarely Damaged by Deer

- Paper Birch
- Common Boxwood
- Russian Olive
- American Holly
- Drooping Leucothoe
- Colorado Blue Spruce
- Japanese Pieris



Northeastern Ornamentals Frequently Severely Damaged

- Balsam fir
- Frasier fir
- English ivy
- Norway maple
- Eastern Redbud
- Atlantic white cedar
- Clematis
- Cornelian dogwood
- Winged Euonymus
- Apples

Rhododendrons
Evergreen azaleas
Pinxterbloom azalea
European mountain ash
Yews
American arborvitae
Hybrid tea rose
Winter creeper
Cherries
Plums



Perennial Bulb Trial

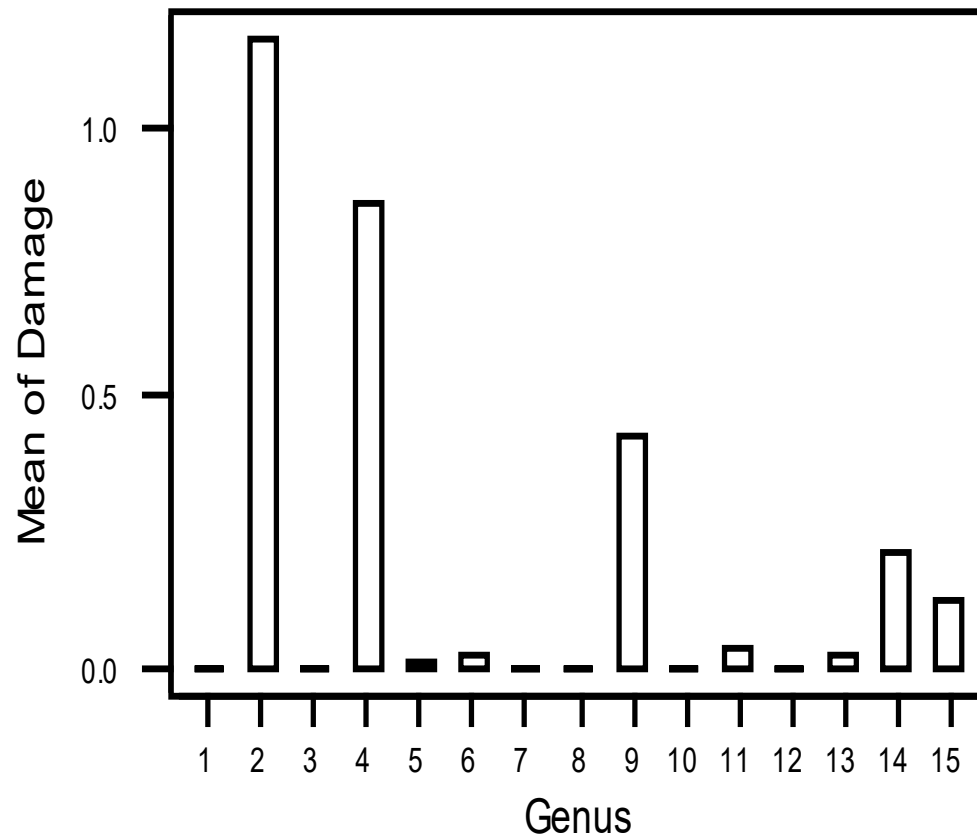


Bulb Varieties in the Trial

- **Narcissus**- Carlton, Ice Follies, Tete a Tete, Minnow
- **Hyacinth**- Pink Pearl, Carnegie
- **Crocus**- Pickwick
- **Allium**- Caruleum, Christophi, Sphaerocephalon, Ivory Queen, Purple Sensation, Neapolitanum
- **Iris**- Buchaica, Blue Diamond, Reticulata JS Dyt and Pauline
- **Fritillaria**- Imperialis Rubra Max, Persica
- **Colchicum**- The Giant
- **Chionodoxa**- Forbesii
- **Galanthus**- Nivalis Single
- **Camassia**- Leigh Coer
- **Arum**- Italicum
- **Muscari**- Armeniacum
- **Scilla**- Siberica
- **Tulips**- Turkestanica, Tarda Dasystemon, Apeldoorm, Monte Carlo



Deer Damage by Bulb Type



- 1 Hyacinth
- 2 Tulip
- 3 Narcissus
- 4 Crocus
- 5 Iris "Blue D"
- 6 Allium
- 7 Arum
- 8 Camassia
- 9 Chionodoxa
- 10 Colchicum
- 11 Fritillaria
- 12 Galanthus
- 13 Iris
- 14 Muscari
- 15 Scilla

Bulbs which Survived both Vole and Deer Damage

- Narcissus 'Carlton'
- Narcissus 'Ice Follies'
- Narcissus 'Tete a Tete'
- Narcissus 'Minnow'
- Hyacinth 'Pink Pearl'
- Hyacinth 'Carnegie'
- Colchicum autumnale
- Fritillaria persica
- Galanthus nivalis
- Dutch Iris 'Blue Diamond'
- Iris reticulata 'JS Dijt'
- Iris reticulata 'Pauline'
- Arum italicum
- Allium sphaerocephalon
- Allium caruleum
- Allium christophii
- Fritillaria imperialis 'Rubra'
- Allium aflatunense 'Purple Sensation'

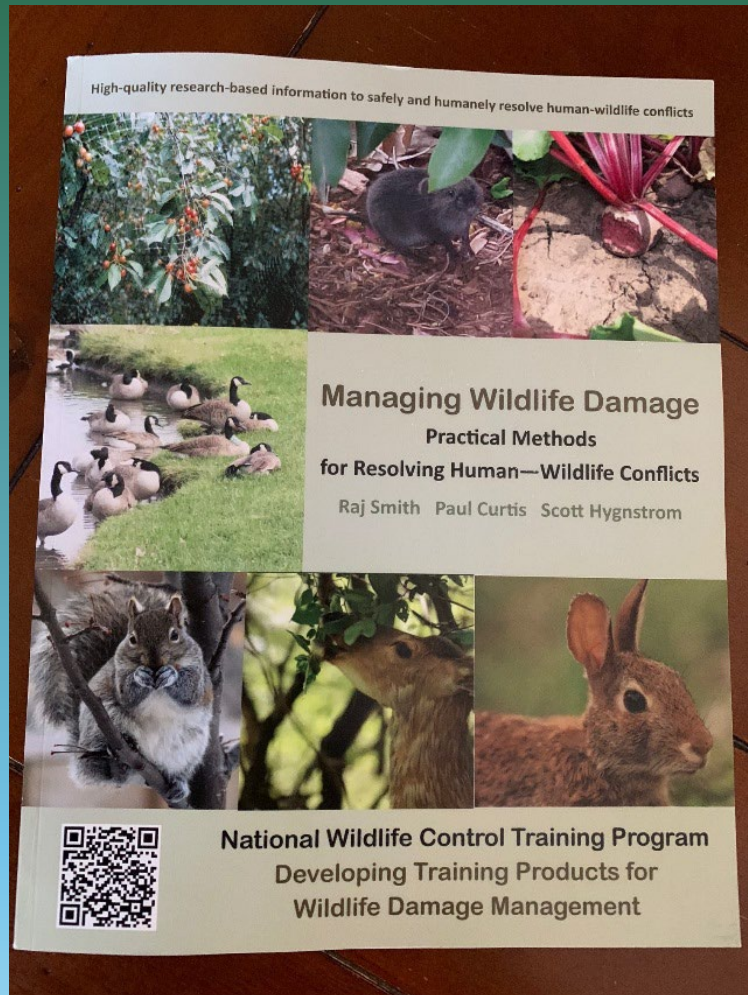
Buck Rubbing Damage



Lessons Learned

- ✓ It's possible to design more deer resistant landscapes with careful plant selection
- ✓ Exclusion provides the best long-term protection for plants
- ✓ Deer repellents can be used for short-term plant protection
- ✓ Hunting is the primary method for reducing deer numbers at a landscape scale
- ✓ Hunting alone is unlikely to reduce deer abundance to levels where forests will regenerate, or crops will be protected
- ✓ Fertility control (sterilization) can reduce deer abundance on small areas but is expensive (experimental in some states)

For More Information:



<http://wildlifecontrol.info>

For PDF files and fact sheets

<http://wildlifecontrolTraining.com>

For professional training course
and books

Curtis, P. D. 2020. After decades of suburban deer research and management in the eastern United States: where do we go from here? *Human-Wildlife Interactions* 14(1):111-128.

<https://doi.org/10.26077/k7ye-k912>