

# Creating Climate-resilient School Pest Management Programs

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School and Turfgrass IPM Extension Support Specialist



**New York State  
Integrated Pest Management**



*Karen J. English, 2020*

# Topics for today

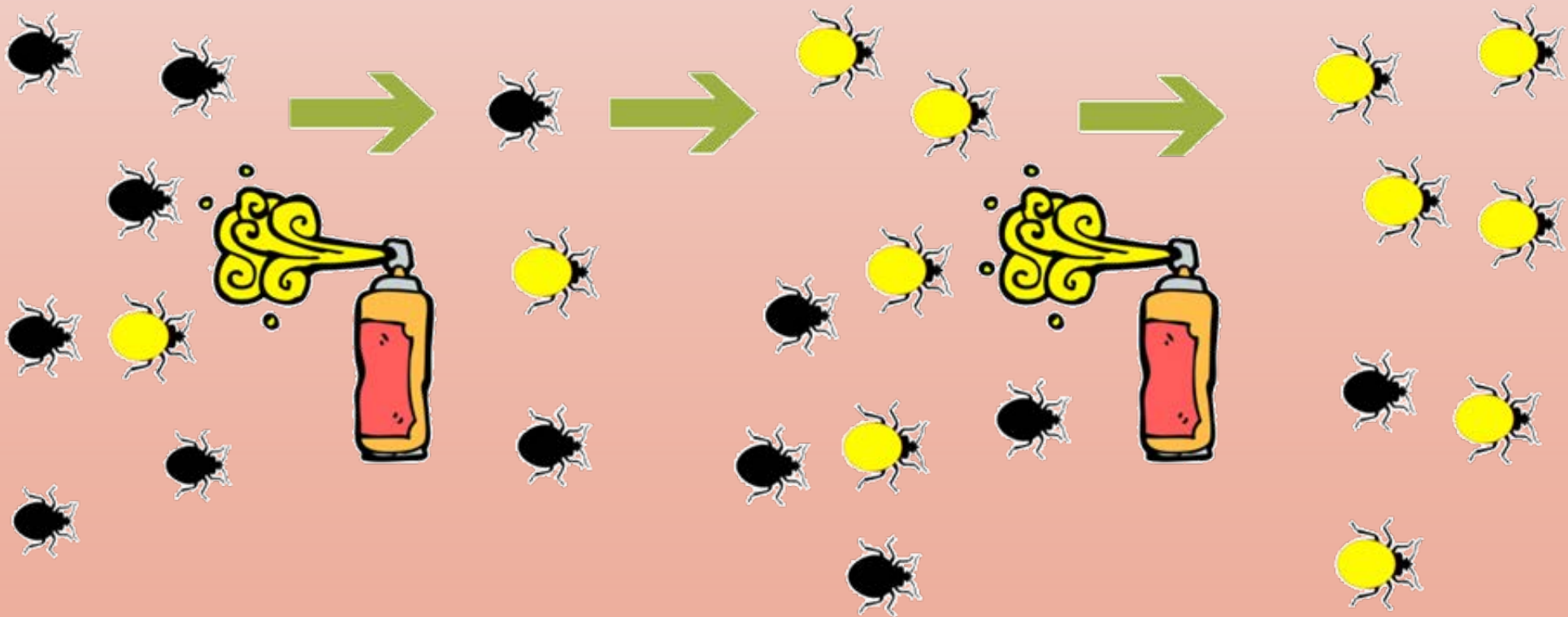
- Climate change impacts on pests
- Integrated Pest Management goals and tactics
- It takes a village
  
- QR code alert – keep those phones handy


# Pests and diseases and climate change: Is there a connection?

- Climate change can affect:
  - population size
  - survival rate
  - geographical distribution of pests
  - intensity, development and geographical distribution of diseases.

# Impact on Pests – Increased Pesticide Resistance

- RESISTANCE - the inevitable consequence of constantly treated a pest with pesticides.





Climate warming  
promotes pesticide  
resistance through  
expanding  
overwintering range  
of a global pest

Pesticide resistance was 158 times  
higher in overwintering sites compared  
to sites with only seasonal occurrence

Ma, CS., Zhang, W., Peng, Y. *et al.* Climate warming promotes pesticide resistance through expanding overwintering range of a global pest. *Nat Commun* **12**, 5351 (2021). <https://doi.org/10.1038/s41467-021-25505-7>

# Pest Management Implications

- Spray and pray will be increasingly less effective
- Non-chemical management will be increasingly more important

# How about rodents? It's complicated.

## Is climate change really driving the ratpocalypse?

You know what rats love? Warmer temperatures.



Chanawat Phadwichit / Getty Images

PCT  
Pest Control Technology

## Climate Change Means More Mice in Canada

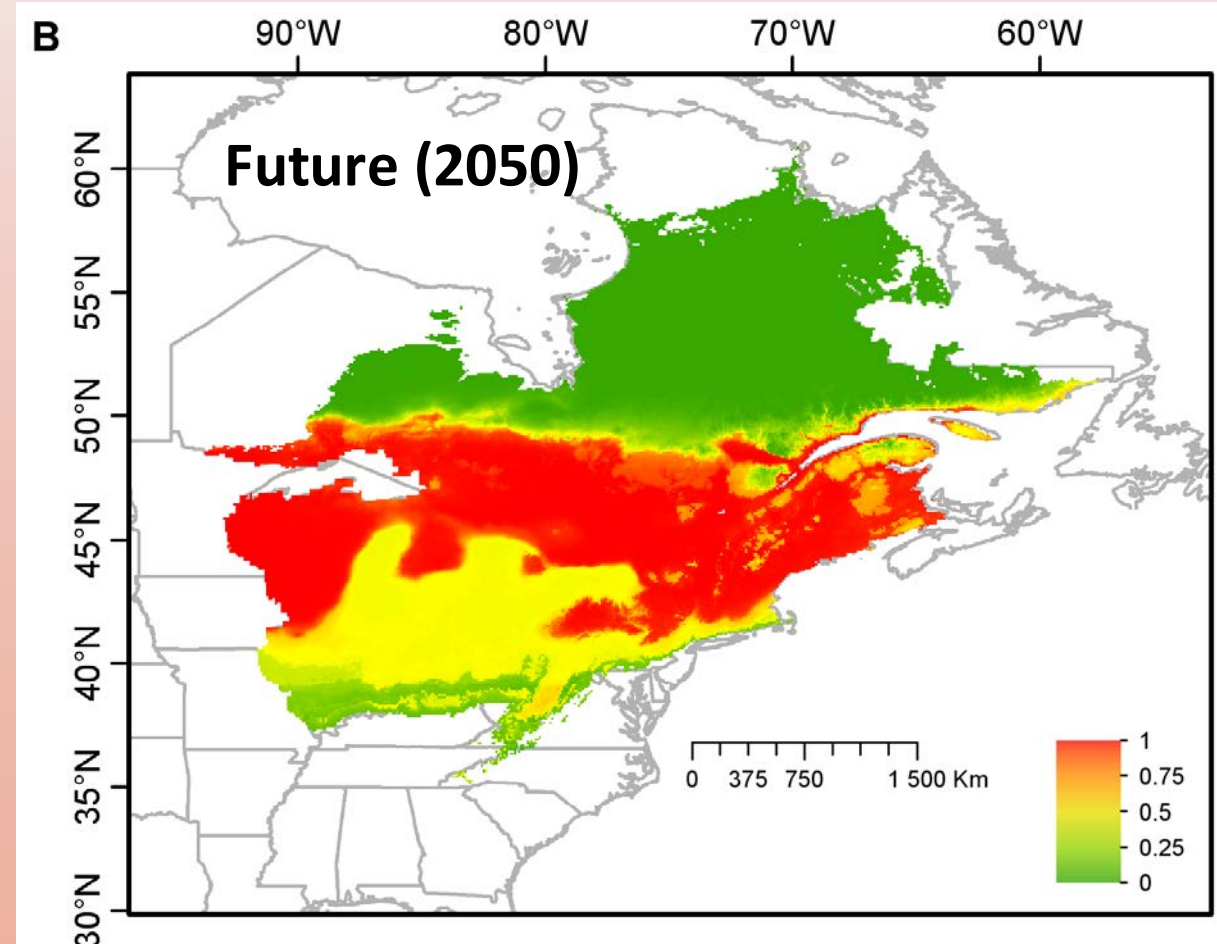
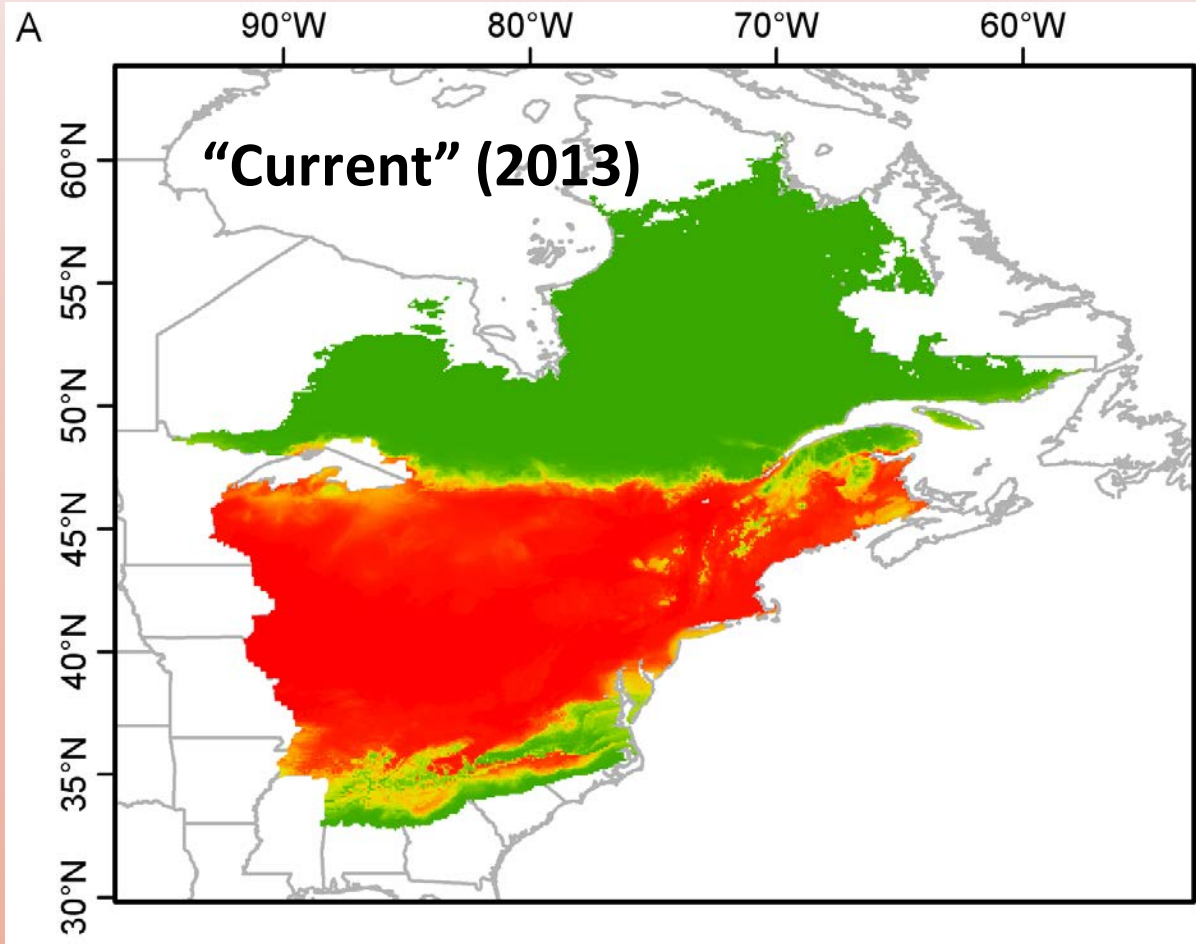
Expansion of white-footed mouse territory also may cause greater incidence of Lyme disease.



ANNE NAGRO

PUBLISHED SEPTEMBER 01, 2022 | UPDATED DECEMBER 31, 2022

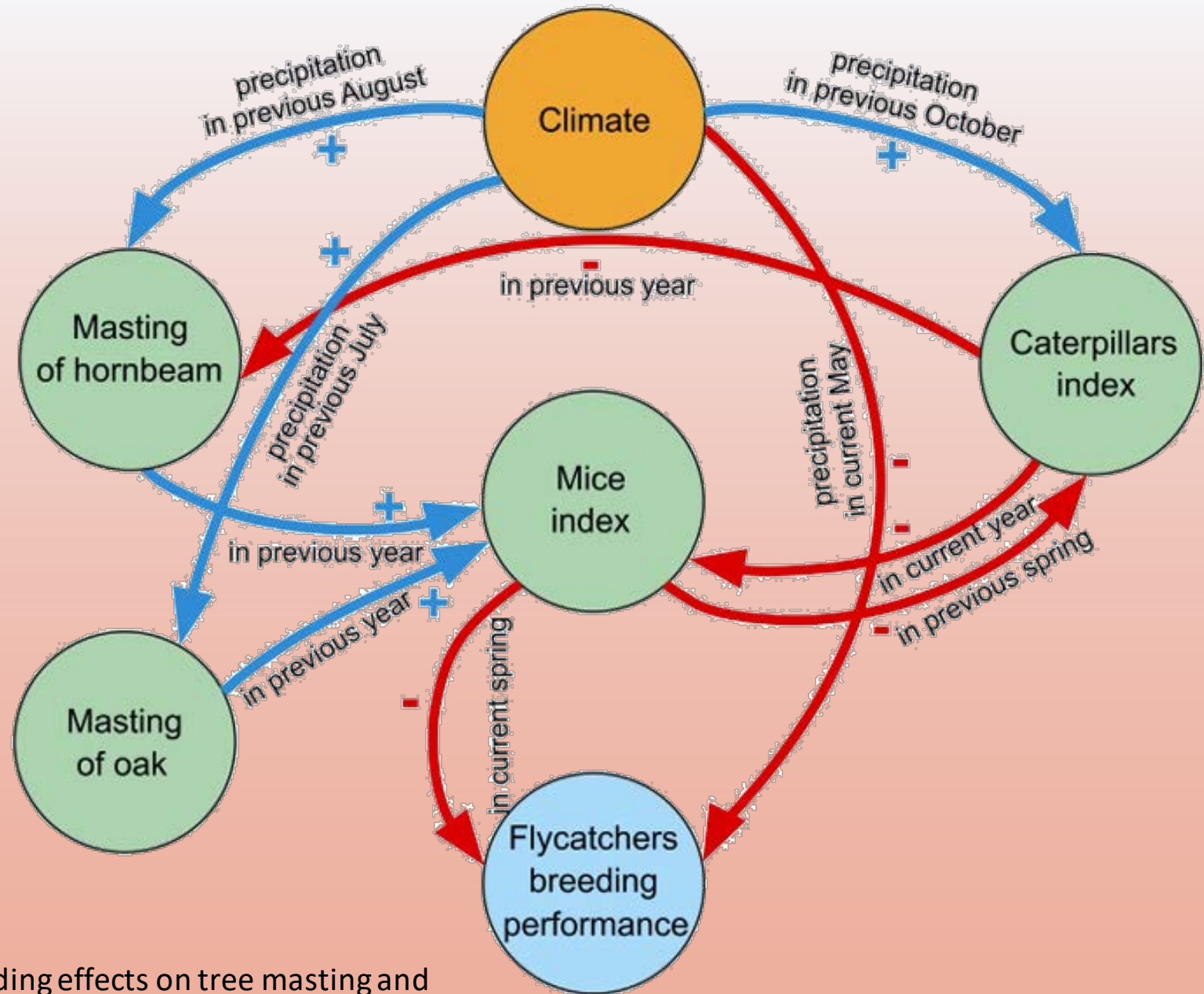
# Predicted distribution of the white-footed mouse



Roy-Dufresne, E., Logan, T., Simon, J. A., Chmura, G. L., & Millien, V. (2013). Poleward expansion of the white-footed mouse (*Peromyscus leucopus*) under climate change: Implications for the spread of lyme disease. *PLoS ONE*, 8(11).  
<https://doi.org/10.1371/journal.pone.0080724>



# Climate change and tree masting



Czeszczewik, D., et al. (2020). Climate change has cascading effects on tree masting and the breeding performance of a forest songbird in a primeval forest. *Science of the Total Environment*, 747. <https://doi.org/10.1016/j.scitotenv.2020.142084>

# Climate change impacts tree masting

**Mast year**

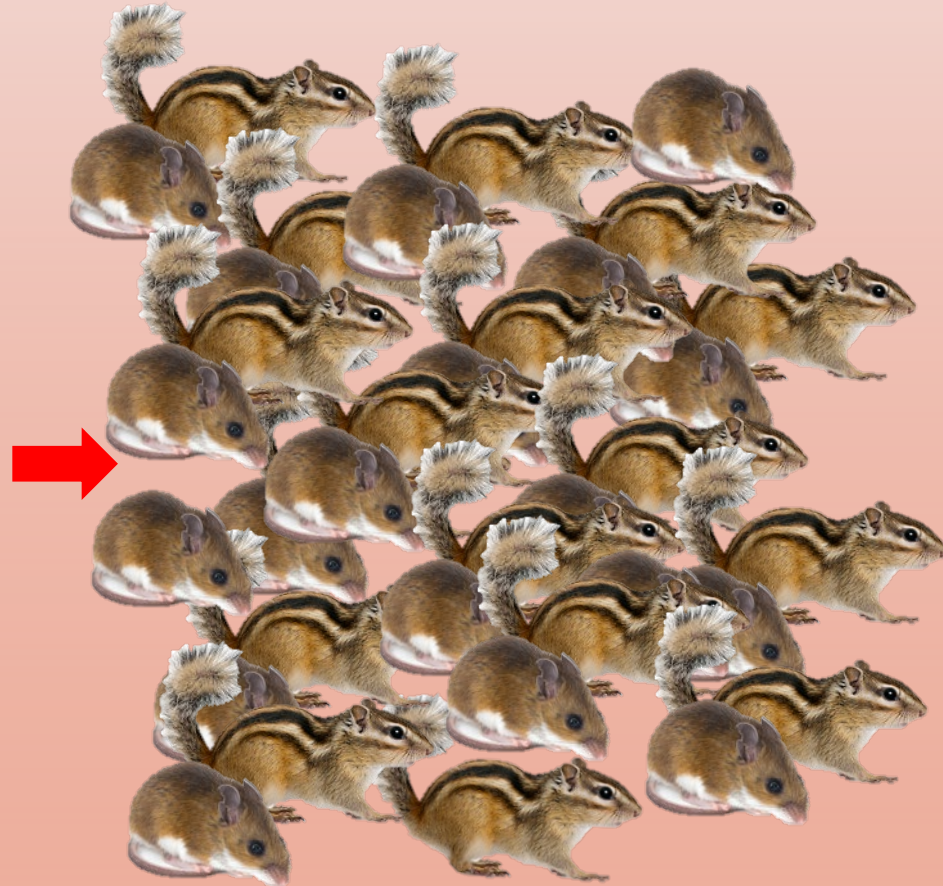


# Climate change impacts tree masting

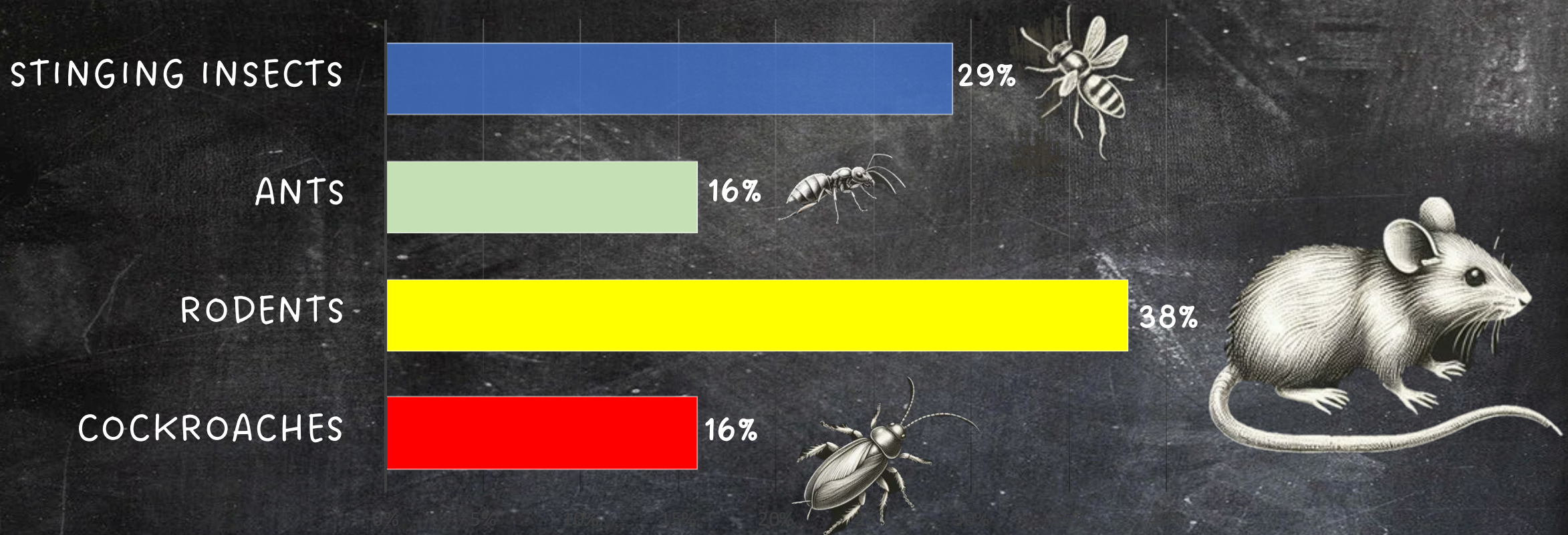
**Mast year**



**The following year**



# Which of the following is most challenging to manage when servicing in and around schools?

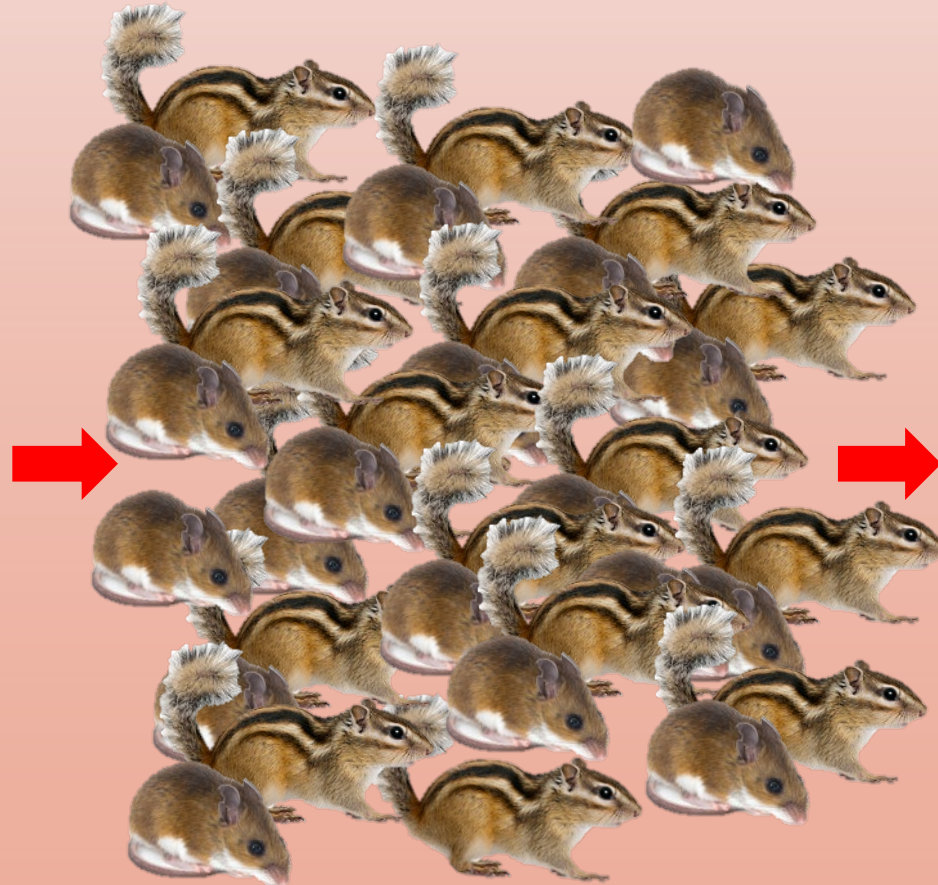


# Climate change impacts tree masting

**Mast year**



**The following year**



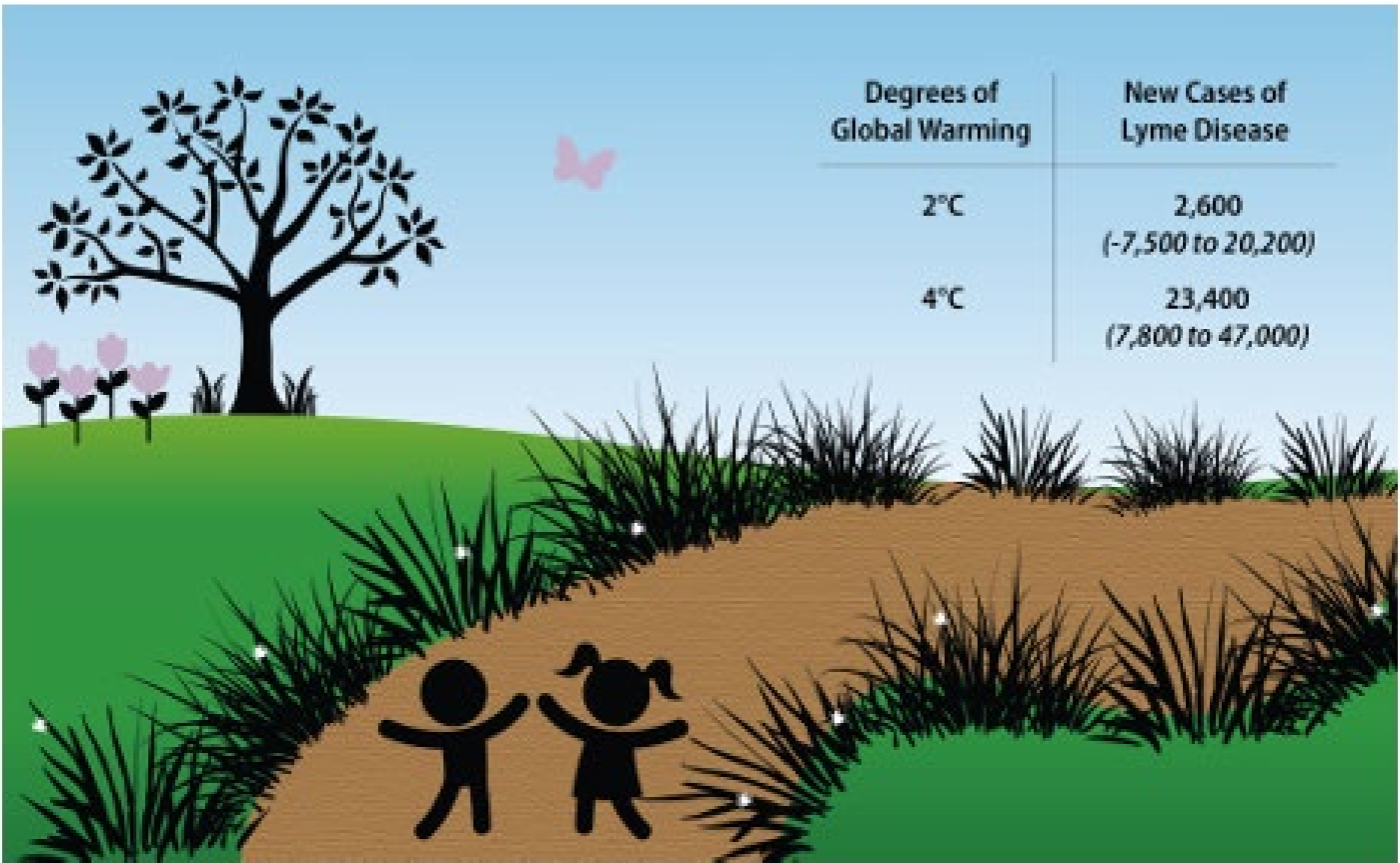
**The year after that**



Photo: Jesse Brunner



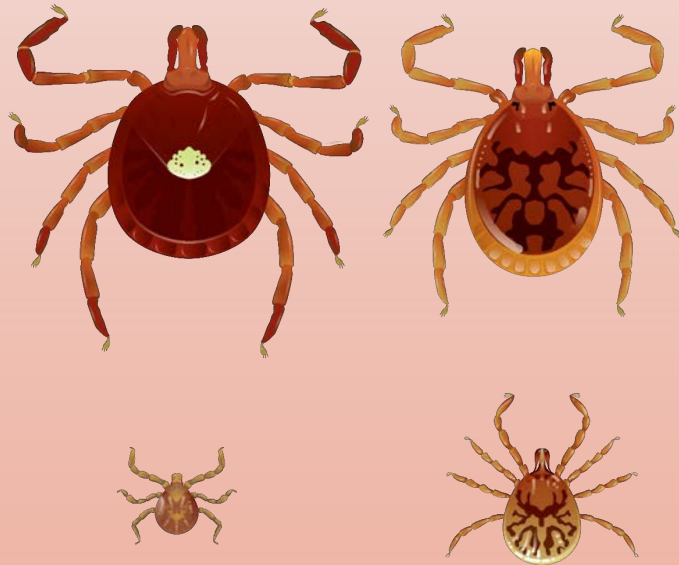
Figure 27: Projected Additional Cases of Lyme Disease Among Children Per Year Attributable to Climate Change



EPA. 2023. Climate Change and Children's Health and Well-Being in the United States. U.S. Environmental Protection Agency, EPA 430-R-23-001.

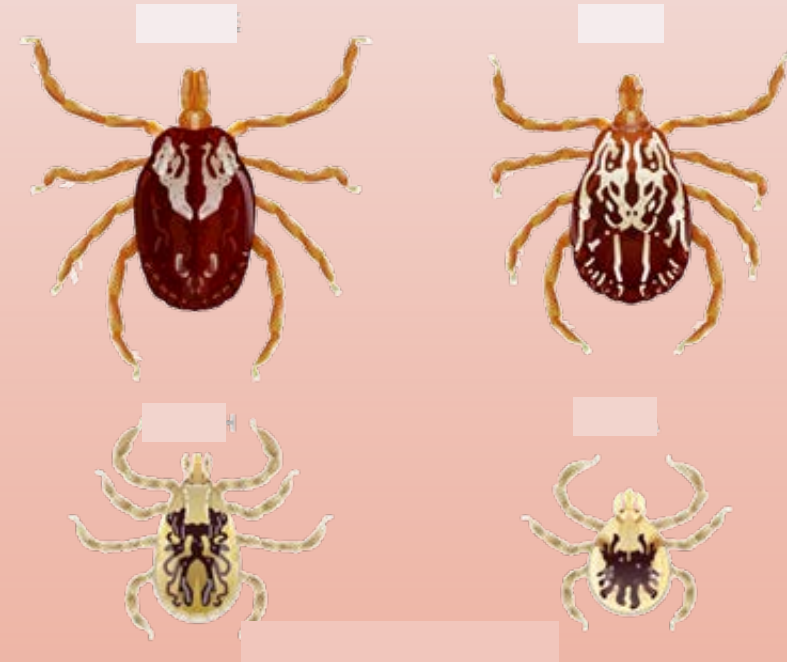
# Climate migrants

## Lone Star Tick

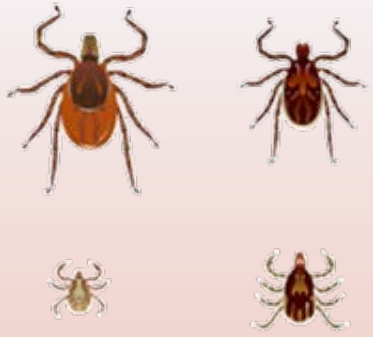


*Amblyomma americanum*

## Gulf Coast Tick



*Amblyomma maculatum*



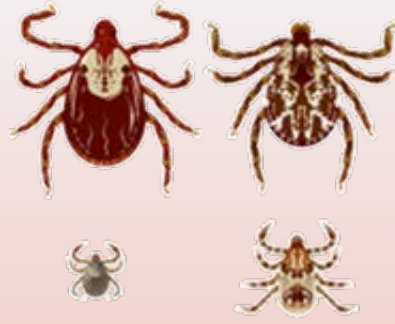
Blacklegged (Deer)

- Lyme Disease
- Anaplasmosis
- Babesiosis
- Hard tick relapsing fever
- Powassan Virus
- Ehrlichiosis
- Tick Paralysis



Lone Star

- Ehrlichiosis
- Spotted rickettsia
- STARI
- Tularemia
- Heartland Virus
- Bourbon Virus
- Powassan Virus
- Alpha-gal allergy
- Tick Paralysis



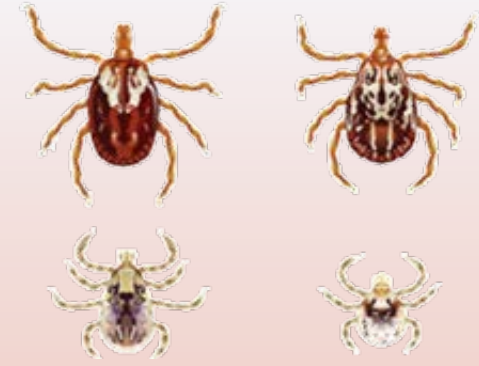
American Dog (Wood)

- Rocky Mountain Spotted Fever
- Tularemia
- Powassan Virus
- Tick Paralysis



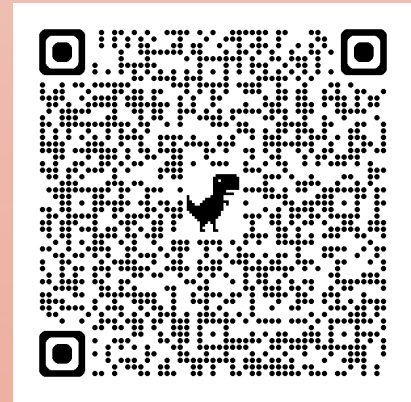
Longhorned

- *Theileria orientalis*
- Rocky Mountain Spotted Fever
- Powassan Virus
- Tick Paralysis
- Severe Blood Loss/Toxicosis?



Gulf Coast

- Rocky Mountain Spotted Fever
- Tick Paralysis



Don't Get Ticked NY  
Health risks  
webpage



# My Prediction





## Why is **Integrated Pest Management** Important?

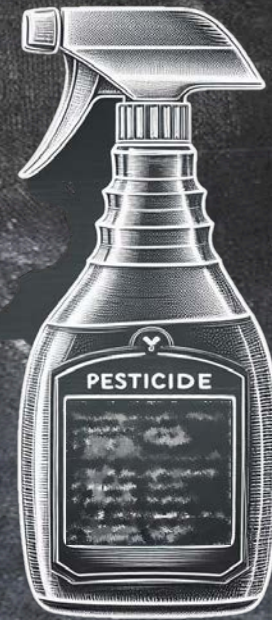
There are health concerns and risks from pests, pest allergens, and management strategies including pesticides, burning, and weed whacking.

# IPM Goal: Keep students and staff healthy and safe

## From Pests



## From Pesticides and other management strategies



YOUR HEALTH

## Poison ivy is poised to be one of the big winners of a warming world

SEPTEMBER 17, 2023 · 5:00 AM ET

FROM **wbur**

By Gabrielle Emanuel



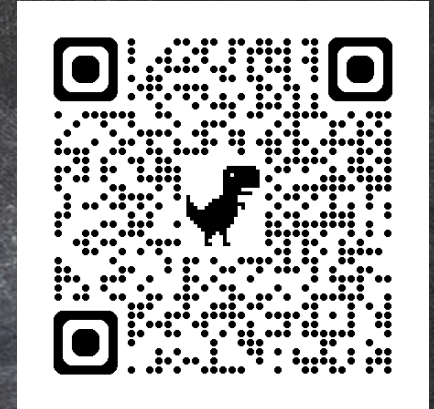
Peter Barron pulls out poison ivy vines in Harvard, Mass.

- Grows faster
- Bigger leaves
- More potent form of urushiol



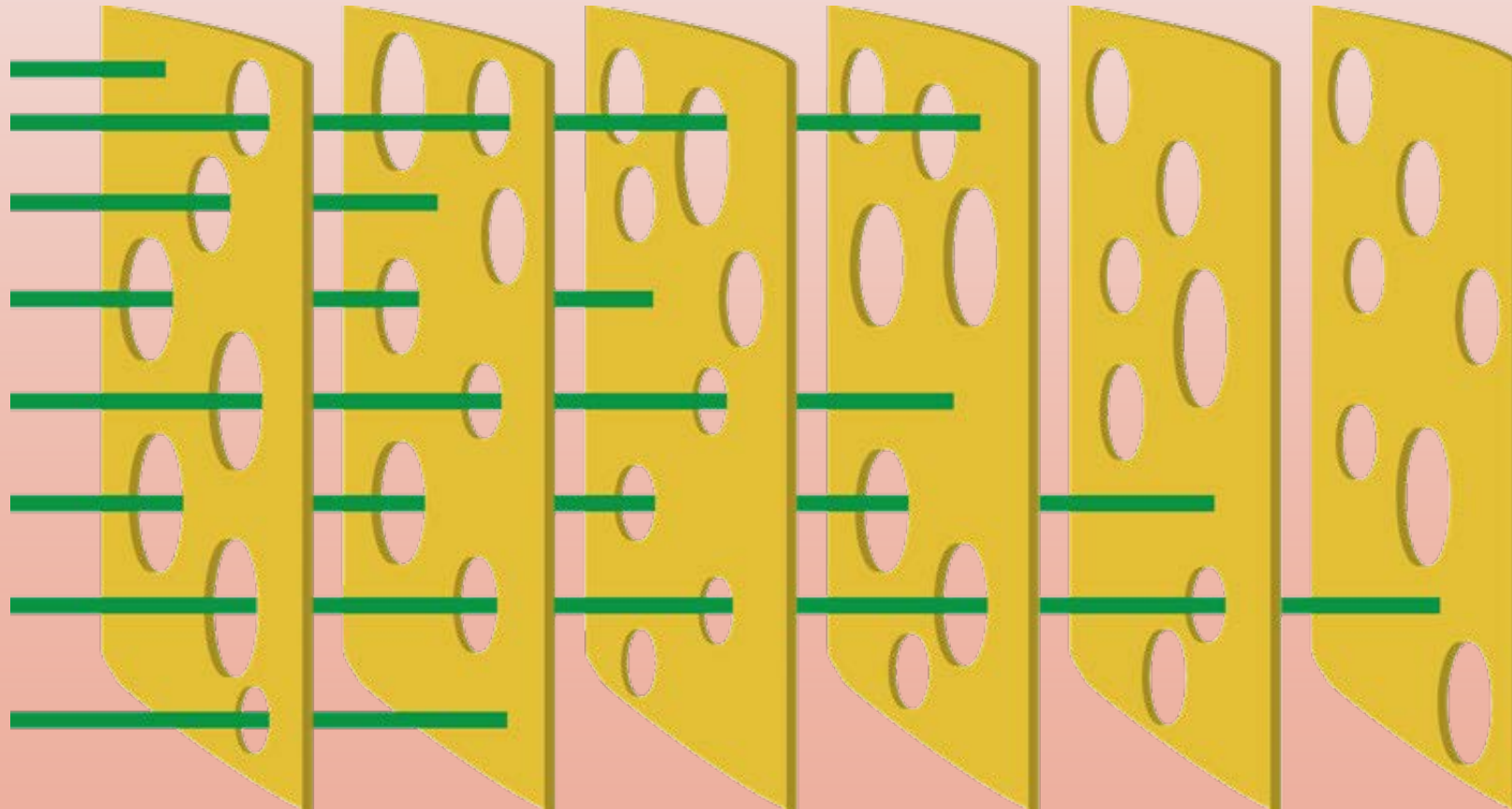
# Pest Management Implications

- Today is focused mostly on the indoors, but we need to pay attention to the outside too.



Turfgrass and Landscape Weed ID  
Pesticide-free Management

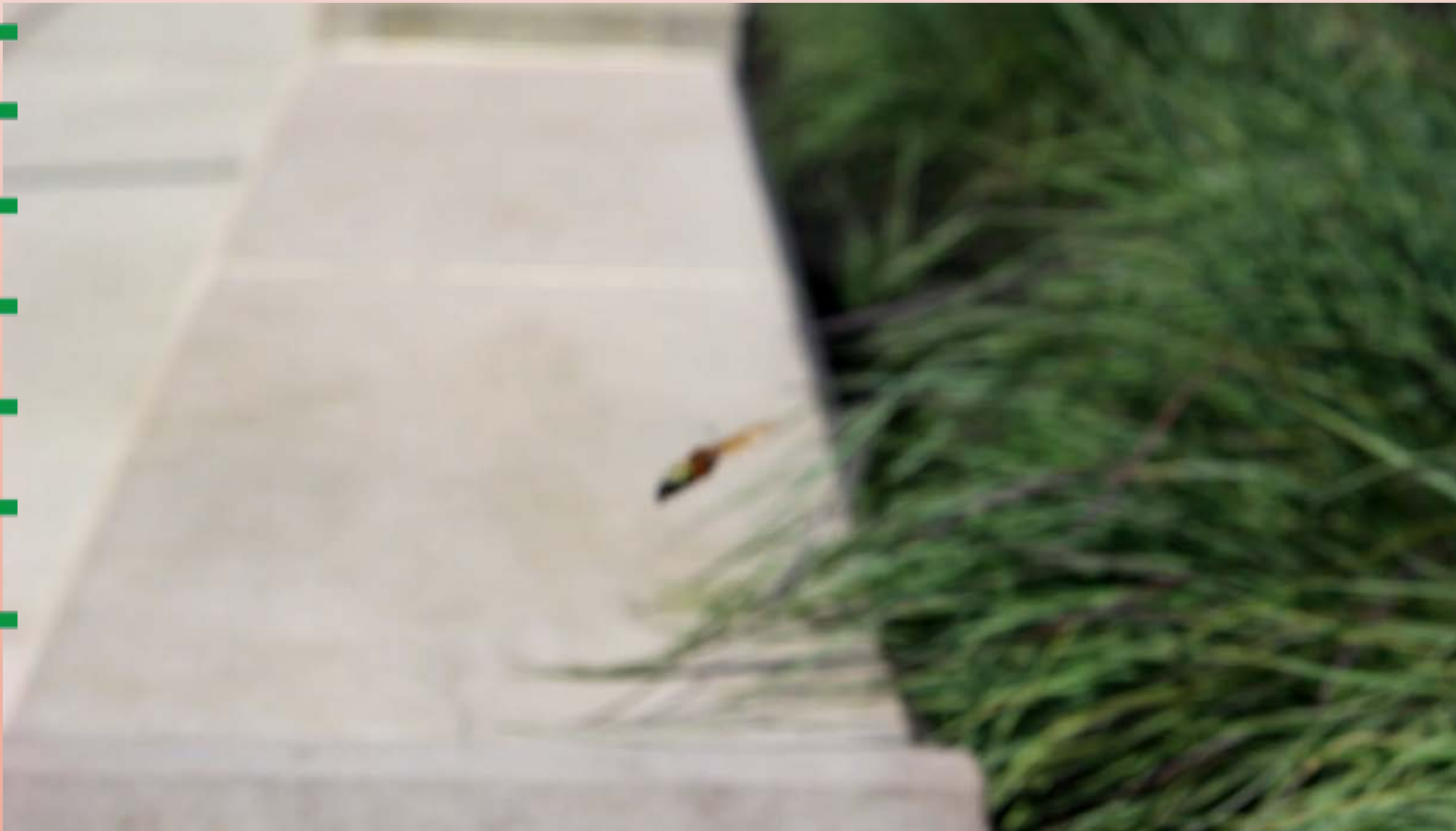
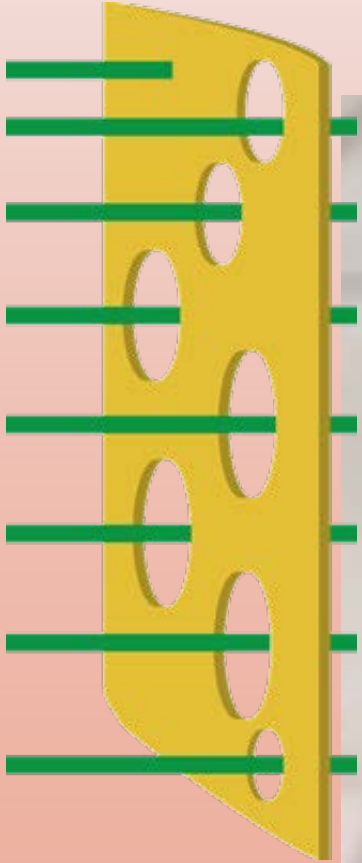
# IPM involves numerous strategies



Redrawn from James Reasons' Swiss Cheese Model, [sketchplanations.com/the-swiss-cheese-model](https://www.sketchplanations.com/the-swiss-cheese-model).

# Strategy 1: Identify pest, scope of problem and its causes

- What are they? - Where are they? - Where are they coming from?- What are they after?



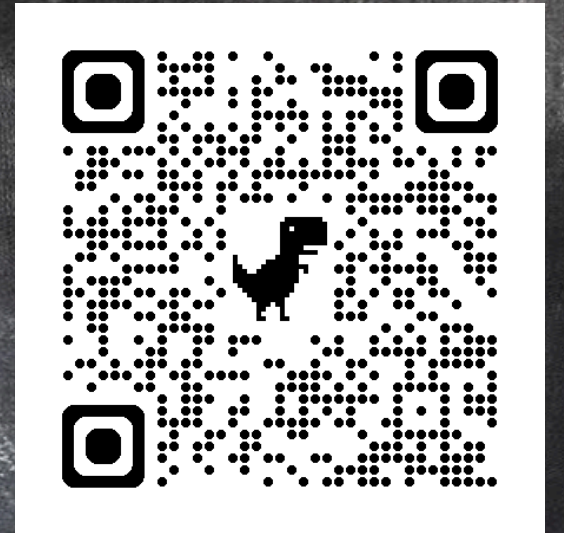
# Inspection





# Pest Management Implications

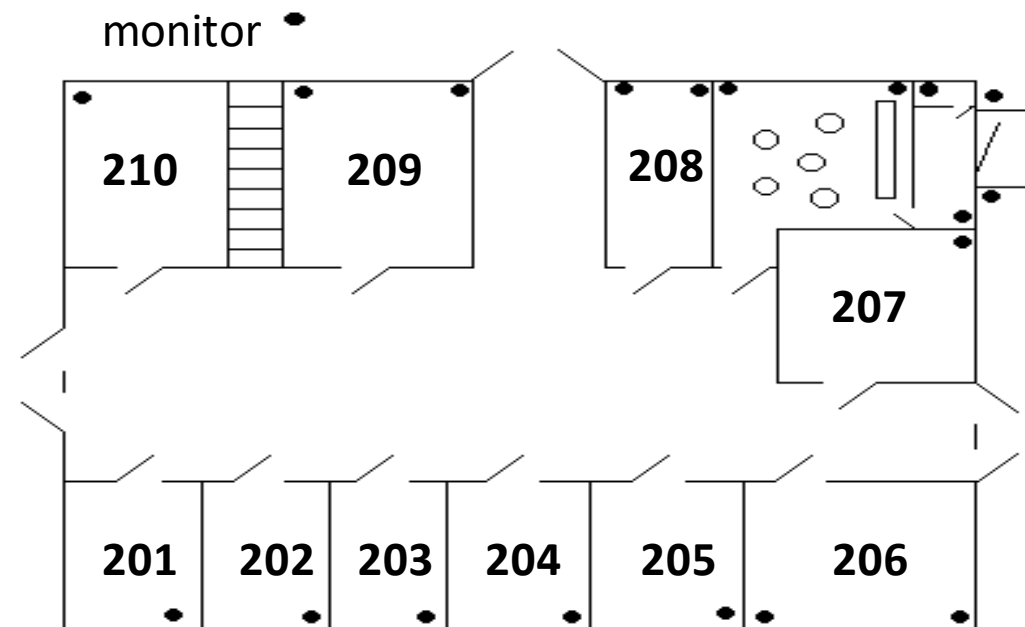
- Invest in the tools for Inspection



Northeastern IPM Center  
School IPM Best Practices:  
**The Steps of IPM**

# Tools for Inspection

- Flashlight
  - Magnifier
  - Zip-lock bags or small jar
  - Clipboard, pencil, paper
  - Map of the facility
- 
- Handy Equipment
    - Extendable mirror
    - Tick drag
    - Glue boards (for monitoring)



Inspect for  
the pest





Inspect for pest signs

# Inspect for food and water

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# Inspect for access

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# Monitoring For when you're NOT there



# Monitoring vs. Sticky traps

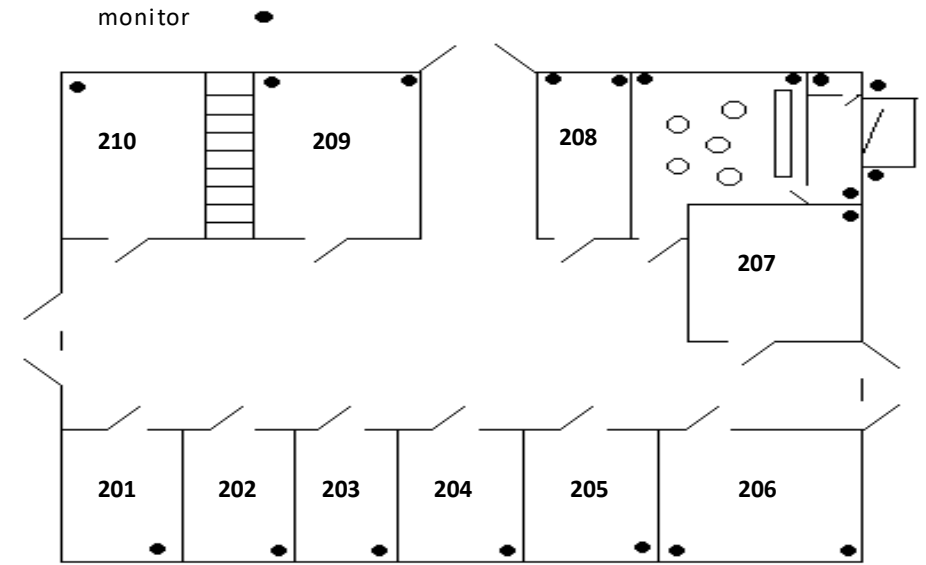
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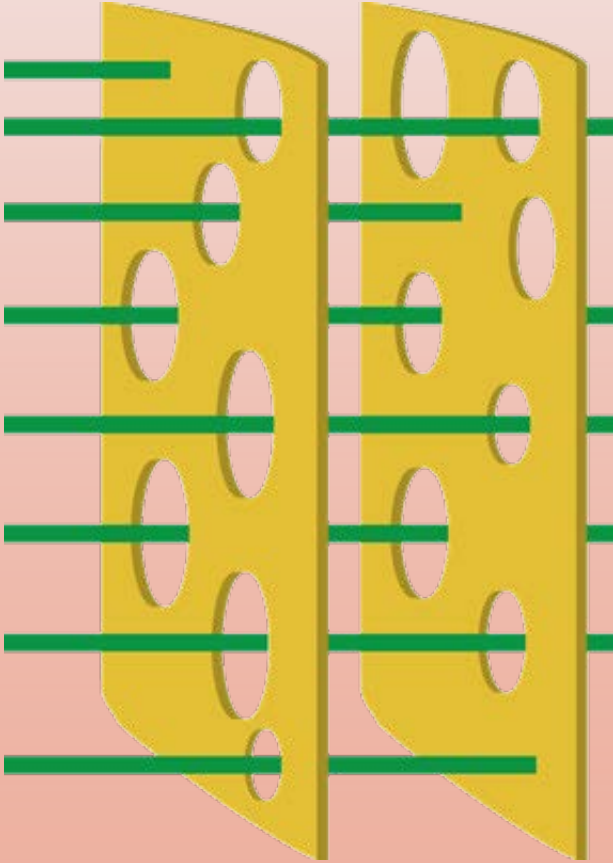


# Keep a floor plan in the logbook to mark:

- pest problems
- device locations
- Need for structural repairs and improvements



## Strategy 2: Make a plan and choose your tactics



# Tactics must be reasonable and affordable

- Prohibit all food from the school building



# Tactics must be reasonable and affordable

- Prohibit all food from the school building
- Prohibit all food from classrooms



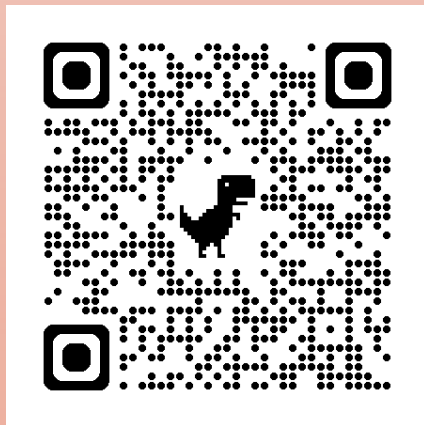
# Tactics must be reasonable and affordable

- Prohibit all food from the school building
- Prohibit all food from classrooms
- Ensure all food stored in classrooms overnight are kept in pest proof containers



# Tactics must be reasonable and affordable

- Breakfast (and lunch) in the classroom?
  - Develop a clean up plan involving custodial and food service staff, and teachers
  - Trainings
  - Reduced clutter
  - Waste management plan

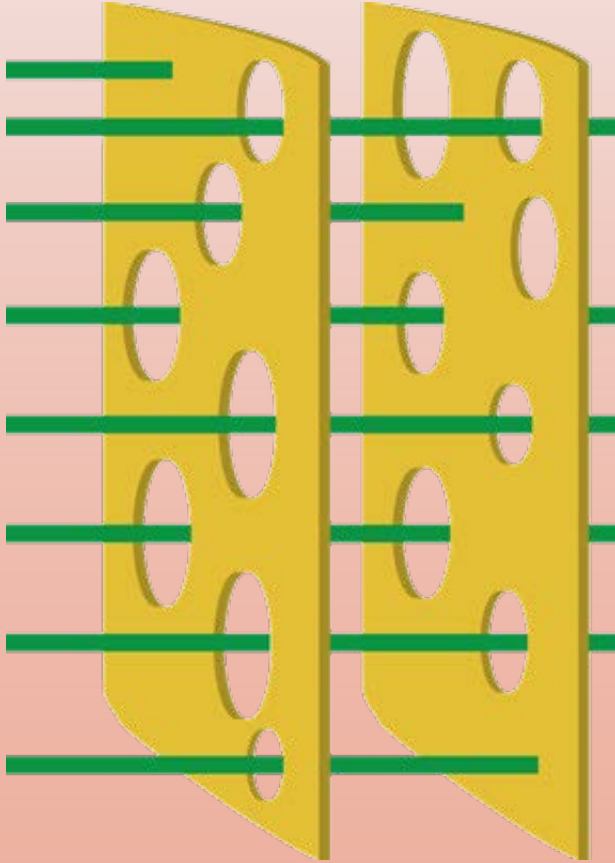


Northeastern IPM Center  
School IPM Best Practices webpage:  
**Breakfast in the Classroom**



Photo: U.S. Department of Agriculture, flickr

## Strategy 2: Make a plan and choose your tactics



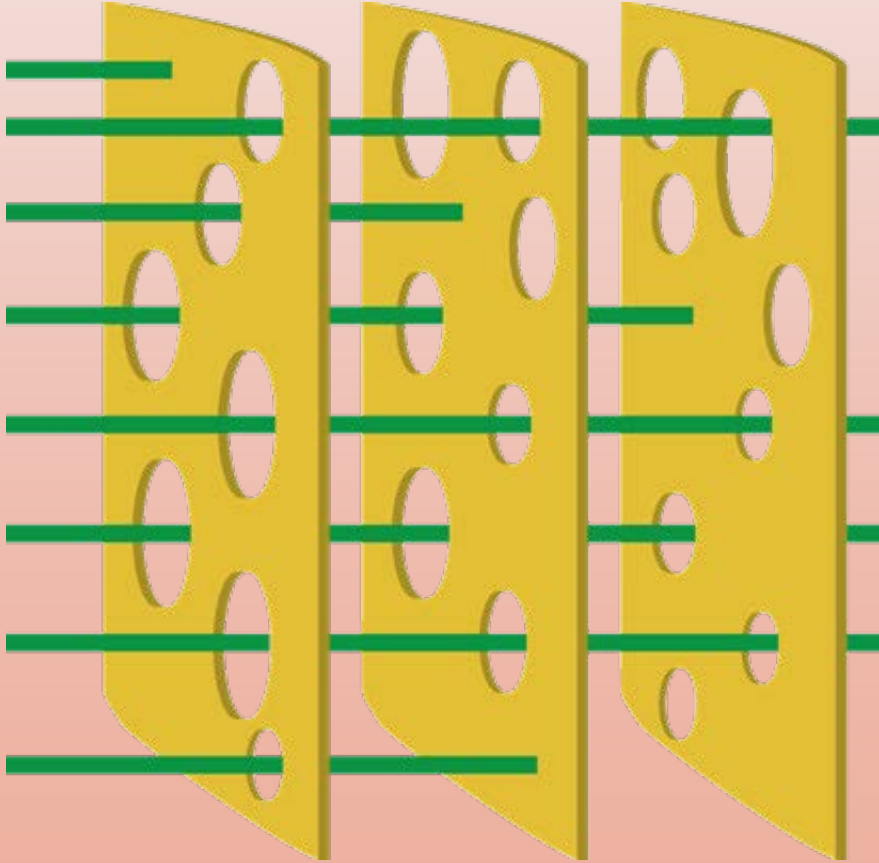
Remove food → **Sanitation** is IPM

Remove water → **Fixing leaks** is IPM

Remove shelter → **Tidiness** is IPM

**Make sure these steps are in the IPM Plan!**

# Climate-resilient Schools Invest in Infrastructure



Racole @ Flickr "Cockroach on Window Screen in the Glow of a Massage Parlour" East Village, New York



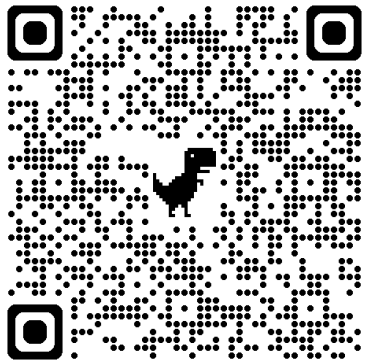
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# Pest exclusion – Eliminate access to and through building

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Gaps around plumbing provide access— seal them permanently



NYSIPM:  
Scientific Coalition on  
Pest Exclusion page



Steel wool will rust away



Copper mesh is better

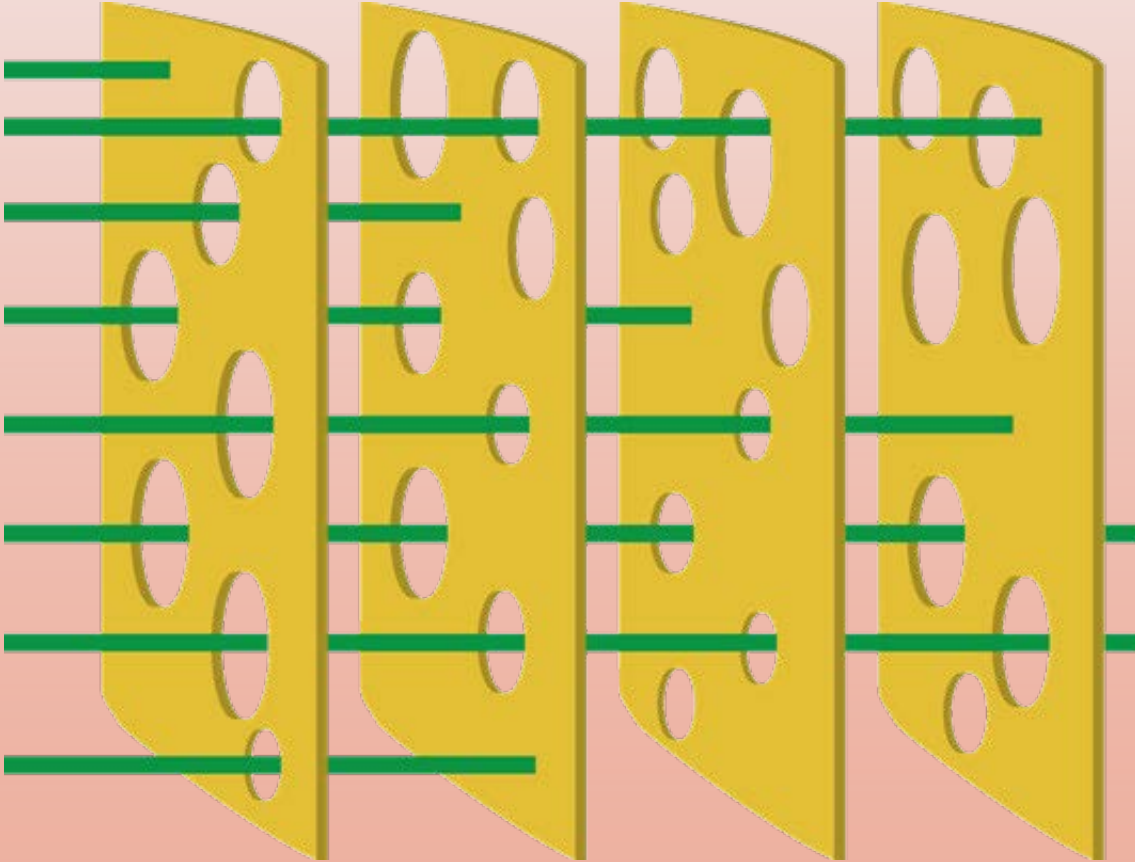


Escutcheon plates are permanent

# Invest in door sweeps that hold up against rodents



# Tactic: Reducing populations





## Tactic: Reducing populations with pesticides

- Pesticide resistance increasing
- Only a DEC Certified Pesticide Applicator or Certified Technician can apply pesticides in schools
- This includes 25(b) products
- Districts with certified personnel on staff has been decreasing.
- Many schools are contracting out pest management.

# Find a reliable pest management company



- Company is licensed by NYSDEC and insured.
- Company is a member of professional orgs like NPMA.
- Online reviews are good and trustworthy.
- They know and use integrated pest management.
- Company reps LISTEN to your concerns and work with you.
- Willing to try low-risk strategies if you desire (heat, steam, vacuum)
- Proposes plan for eradication, not just management.
- Willing and able to exclude pests by making small repairs.

# Pest Management Implications

- If the district does not have a Certified Applicator on staff, there should still be trained staff to work with the contracted pest management professional.
- Requests for bids should include IPM expectations
- Only qualified bids including those expectations should be accepted
- Responsibilities must be clear and in contracts.

# Mice, fire safety issues concern city, school leaders

Lack of oversight, compliance complicate problems



1 of 5

School Operations and Maintenance Director Rick Underwood spoke before Lowell's Board of Health about health and safety issues in Lowell Public Schools on Oct. 2, 2024. (Courtesy Lowell TeleMedia Center)



By **MELANIE GILBERT** | mgilbert@lowellsun.com

PUBLISHED: October 4, 2024 at 4:33 a.m.

<https://www.lowellsun.com/2024/10/04/mice-fire-safety-issues-concern-city-school-leaders/>



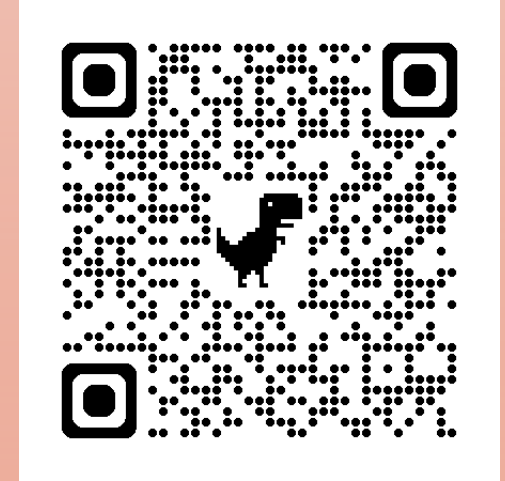
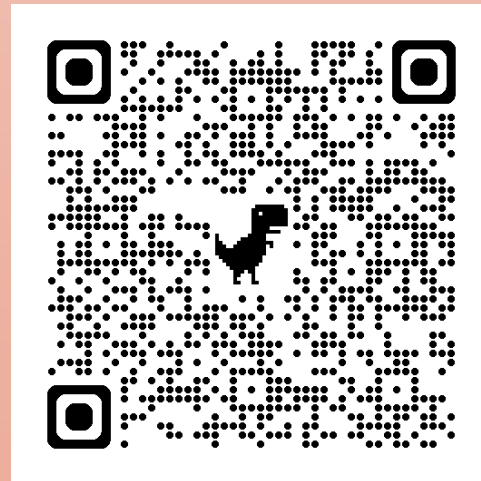
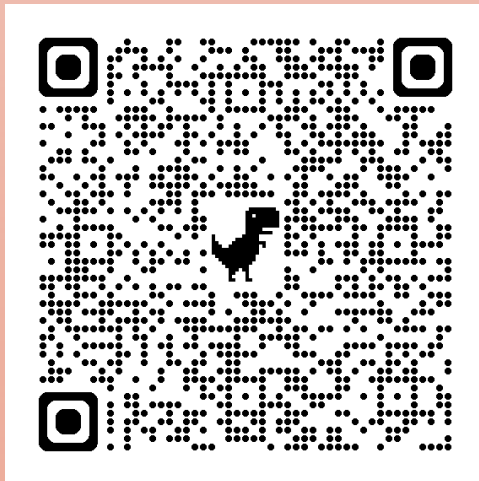
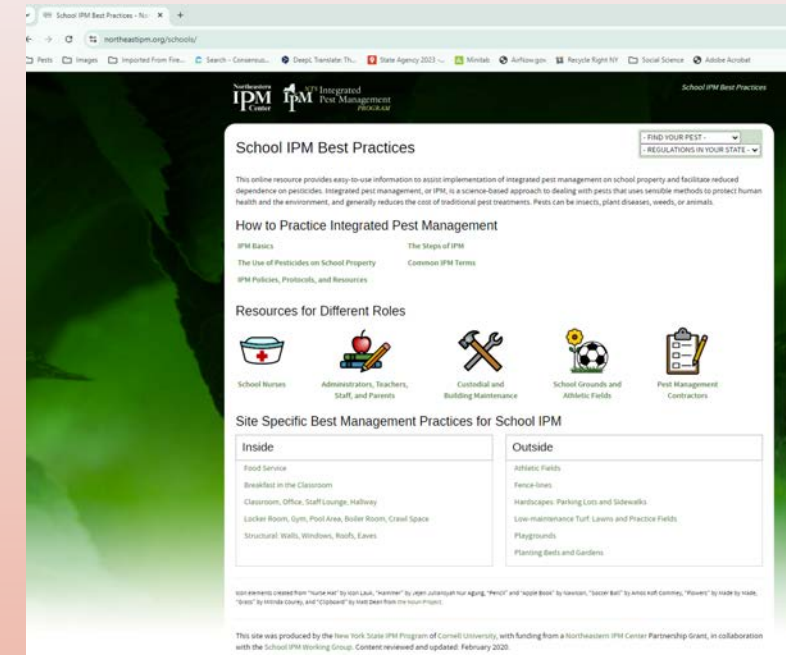
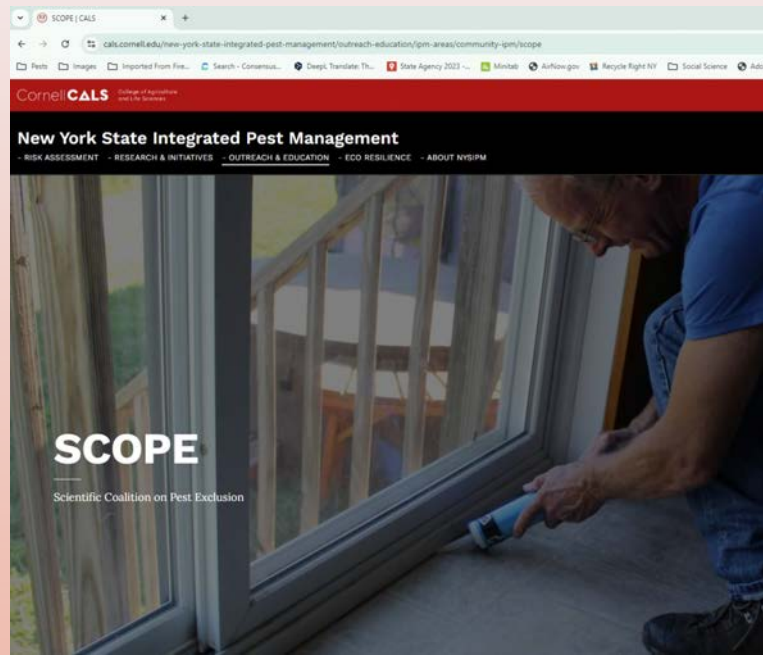
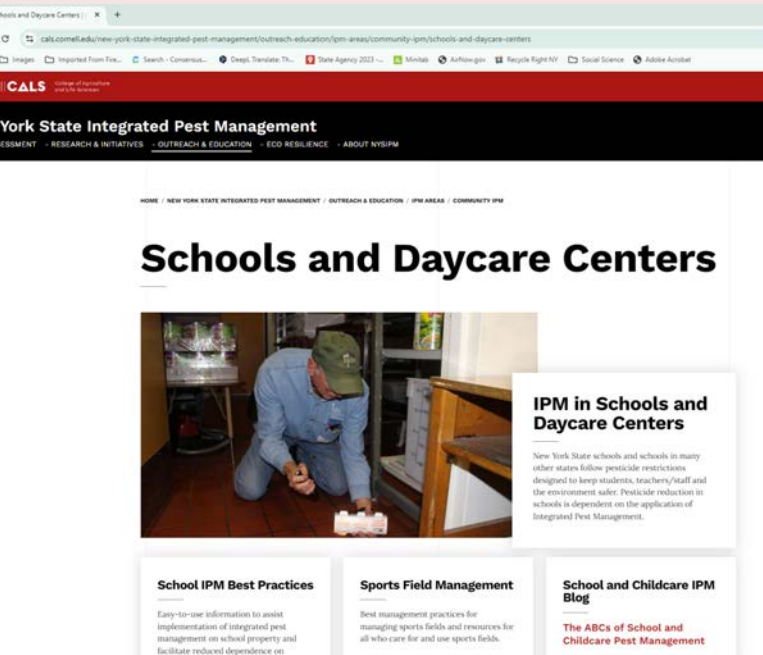
# Pest Management Implications

- Who needs to be involved?
  - Building owner
  - District
  - Building leadership
  - Buildings and Grounds staff
  - Food service staff
  - Teachers
  - Administrative staff
  - Nurse
  - Students
  - Pest Management Professional
  - Cornell IPM
  - ...



Health & Safety  
Committee

# Resources to Help



It takes a village.  
We are part of yours!



## Our Team

New York State Integrated Pest  
Management Program



**New York State  
Integrated Pest Management**

