Nurturing Nature in Our Lawns

UVM Extension Master Gardener Conference
December 7, 2024

Sarah Kingsley-Richards
Pesticide Safety Education Program
go.uvm.edu/psep

THE UNIVERSITY OF VERMONT EXTENSION

Background
- Perspectives
- Definitions

Approaches
- Function
- Groundcovers

Maintenance
- Installation
- Pest Management

Resources

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Background

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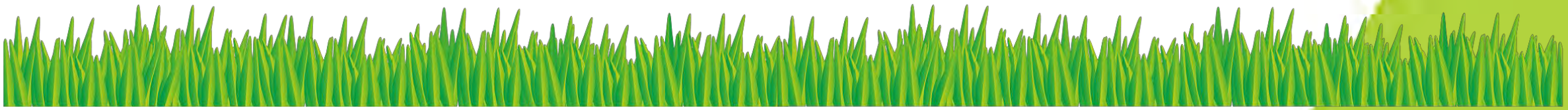

https://www.pickpik.com/beautiful-home-garden-new-england-style-landscaping-gardening-modern-141696
https://commons.wikimedia.org/wiki/File:Lawn,_Mellerstain_House_-_geograph.org.uk_-_4874404.jpg
https://creazilla.com/media/clipart/3165340/grass

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https://www.flickr.com/photos/werms/6061274796
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https://www.pickpik.com/beautiful-flower-bed-bloom-blossoms-color-148480
https://commons.wikimedia.org/wiki/File:Japanese_Garden_@_UH_Manoa_%285674159114%29.jpg
https://www.flickr.com/photos/59898141@N06/5869537210

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Lawns are Very Good at What They Do

- Inexpensive to establish
- Provide open vistas, line of sight
- Define areas, planting beds
- Handle **random** foot traffic
- Produce oxygen
- Absorb rainwater
- Prevent erosion
- Reduce **pest** shelter
- Few flowers/bees (safety)

https://www.wannapik.com/vectors/19914?search%5Bcategory_id%5D=1696

Lawn Limitations

- Don't handle **patterned** foot traffic
- Difficult areas
  - Slopes
  - Un-mowable (traffic islands, green roofs)
  - Delayed spring maintenance
- Require frequent input

Equipment, Time, Fuel, Exhaust,

Water, Fertilizers, Pesticides,

Equipment Maintenance

$110 Billion annual industry

YES MOW MAY

https://picryl.com/media/way-path-dilemma-486a25?zoom=true, https://commons.wikimedia.org/wiki/File:University_of_Malaya_Traffic_Island.jpg
https://commons.wikimedia.org/wiki/File:Stadspark_Montfoort.JPG, https://vectorportal.com/vector/blue-lawn-mower.ai/33894

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What is a Lawn?

Lawn

- Ground (as around a house or in a garden or park) that is covered with **grass** and is kept **mowed** (*Merriam-Webster*)
- Area of soil-covered land planted with **grasses** **and other durable plants** … which are maintained at a **short height** with a lawn mower (or sometimes grazing animals) and used for **aesthetic and recreational purposes** (*Wikipedia*)

Turf

- A covering of **mowed grass** vegetation growing together with an upper soil stratum of intermingled roots and stems (*Vermont Rule for Control of Pesticides*)

https://commons.wikimedia.org/wiki/File:Closeup_of_lawn_grass.jpg

What is a Lawn In Vermont?

Cool-season Species

- Kentucky bluegrass –**sun,** high traffic, rhizomes, fertilizer, water, diseases
- Perennial rye grass –**sun,** low traffic, bunches, no fertilizer, grubs
- Fine Fescue –**shade,** low traffic, bunches, water, few diseases

Seed Mixtures

- < 15-20% perennial rye (fast germination)

Weeds can be beautiful!

- Ecological Diversity
- Pollinators, beneficials
- Nutrient cycling

https://commons.wikimedia.org/wiki/File:Grass-flowers-dandelion-spring_-_West_Virginia_-_ForestWander.jpg

Approaches

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What Do You Want to Do with the Lawn?

Look at it

- Up Close or Far Away?
- Uniform or Varied?
- Flowers?

Walk on it

- A Lot or a Little?
- Patterns or Play?
- Pets?

Maintain it

- A Lot or a Little?
- Equipment Required?

https://commons.wikimedia.org/wiki/File:Children_playing_on_the_lawn_outside_the_Regional_Museum_in_Stalowa_Wola.jpg

No Lawn

https://commons.wikimedia.org/wiki/File:Indian_lodge_tx_patio.jpg
https://www.advanceddecking.com.au/creating-multi-tiered-decks-expert-tips-for-a-flawless-build/
https://www.flickr.com/photos/ningenkamp/6158123823, https://www.flickr.com/photos/7282451@N02/3798519379

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Artificial Lawn

https://www.flickr.com/photos/garden_and_landscape_design_products/3429161484
https://commons.wikimedia.org/wiki/File:Artificial_grass_in_the_front_yard.jpg

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Other Groundcover Plants

Reasons

- Low growing?
- Low maintenance?
- Monoculture?

Conditions

- Sun vs. Shade
- Wet vs. Dry
- Foot Traffic
- Trees (allelopathic)

Form

- Clumping vs. Spreading
- Height
- Herbaceous vs. Evergreen

Plant Options

- Ornamental Grasses
- Woodies
- Ferns
- Perennials
- Wild

https://www.flickr.com/photos/gardeninginaminute/1526337762

Other Groundcover Plant Species

Deep to Light Shade

- *Pachysandra* – Spurge
- *Lamium* – Dead nettle
- *Tiarella* – Foamflower
- *Hakonechloa* – Japanese Forest Grass

Light Shade

- *Vinca* – Periwinkle
- *Ajuga* – Bugleweed
- *Sagina* – Irish or Scotch Moss

Full Sun to Light Shade

- *Liriope* – Lily turf
- *Sedum* – Stonecrop
- *Thyme* – Creeping thyme
- *Microbiota* – Russian Arborvitae

And Many More . . .

- *Nepeta* – Mint
- English Ivy
- Creeping Junipers
- *Carex* – Sedges

Treadwell

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Plants that Work®

Nooks & Crannies™

url

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Beware Noxious, Nuisance, Aggressive "Thugs"

- *Aegopodium podagraria* -Bishop's Weed, Goutweed
- *Toxicodendron radicans* -Poison ivy
- Violet

Steven Katovich, Bugwood.org #5597566
https://www.flickr.com/photos/calliope/2433192425
Leslie J. Mehrhoff, University of Connecticut, Bugwood.org #5446620

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Maintenance

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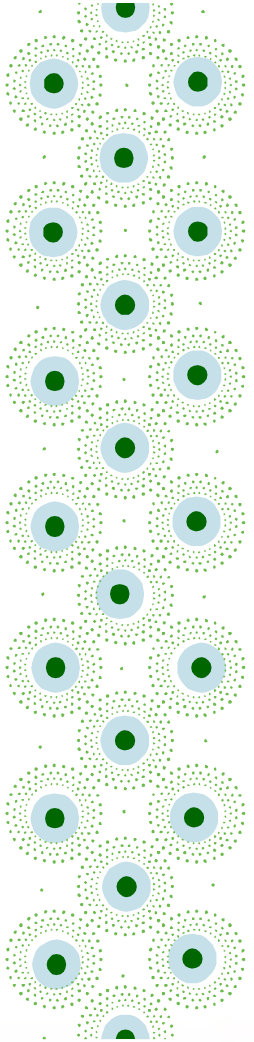
General Installation

- **Remove weeds BEFORE planting**
- Plant in Spring or Fall
- Remember most tree roots are within top 12" of surface
- Plant groundcovers in staggered pattern
- Water well after planting
- Remove fallen leaves, debris that will smother plants
- Some groundcover species can be mown or pruned

https://www.uvm.edu/d10-files/documents/2024-10/LAWNRENOEST.pdf

https://extension.illinois.edu/landscaping/ground-covers

https://extension.unh.edu/resource/groundcovers-new-hampshire-fact-sheet



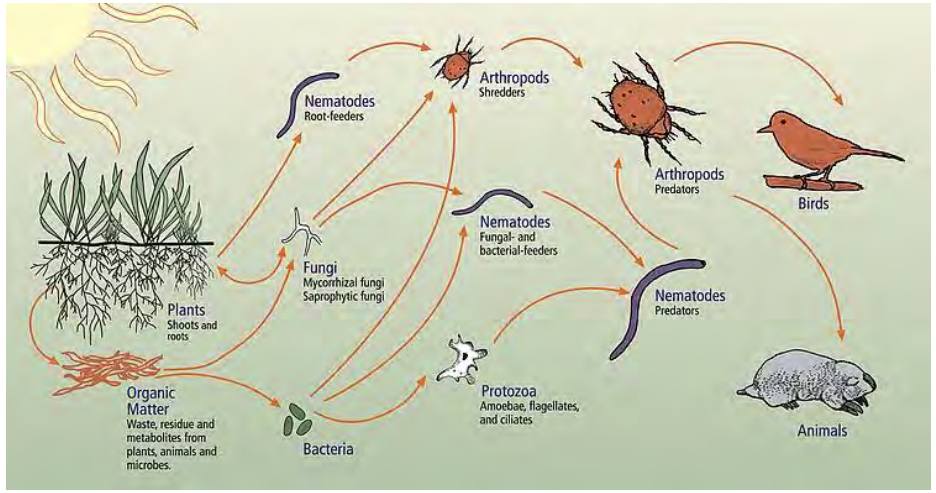
Lawn Management

Unique Micro-Ecosystem

- Select the best species for site/use, avoid monoculture
- Mow high (home lawns)
- Too much management disrupts balance
  - Occasional irrigation/fertilization

Know possible pests/problems

- Determine **TOLERANCE** levels
- Develop management plan
- Monitor



https://en.wikipedia.org/wiki/Soil_food_web

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Integrated Pest Management

Identify

- Plant, pests, beneficials

Prevent

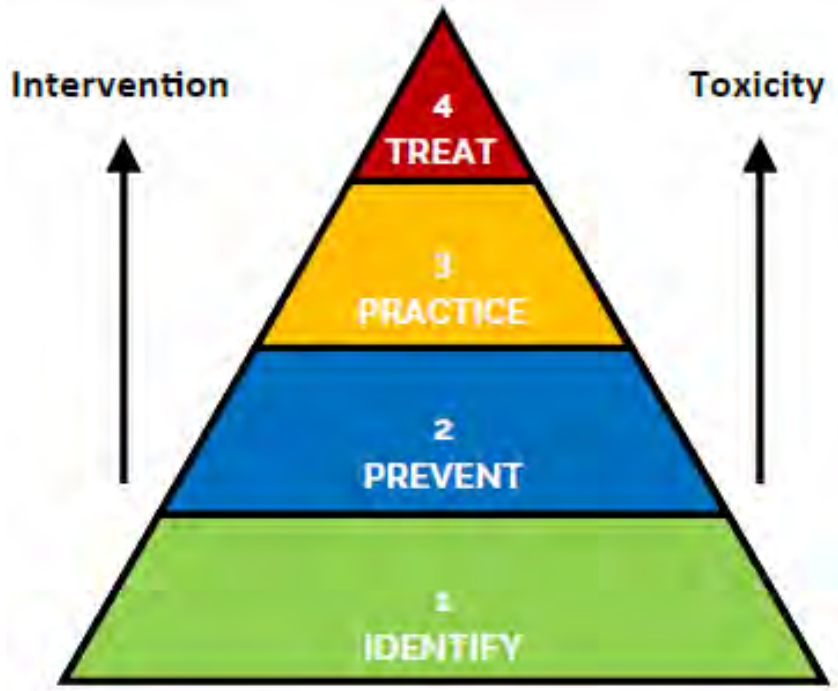
- Plant selection, **soil fertility**, airflow, exclusion

Practice

- **Plant health**, cultivation, removal, trapping
- Provide beneficials habitat, biocontrols

Treat

- **Biopesticides**
- Conventional



The IPM Pyramid

https://www.uvm.edu/sites/default/files/Extension-Community-Horticulture/Resources/IPMOverview2023.pdf

Lawn Integrated Pest Management

Identify

Determine if **biotic** (pests) vs. **abiotic** (nutrients, water, temperature, pH, weather, mechanical, chemical, etc.)

Abiotic	Biotic
Rapid effect (frost)	Build up over time
More than one species affected (hail)	Species-specific
All of one species affected (drying)	Spread through population
Regular pattern (road salt)	Occur randomly

Secondary damage, Multiple causes

https://ag.umass.edu/turf/fact-sheets/whats-wrong-with-my-lawn

https://publicdomainvectors.org/en/free-clipart/Colored-magnifying-glass/47285.html

Lawn Integrated Pest Management

Prevent

Exclusion

- fencing, netting, landscape cloth, black plastic or paper mulch, trunk protectors/wraps

Cultural

- Select proper species for site, plant properly, avoid monocultures
- Improve soil structure (before planting, topdressing)
- Water as needed, especially during establishment
- Maintain proper nutrient levels (compost, organic matter, fertilizer)
- **MOWING height, timing, thatch**

https://www.uvm.edu/d10-files/documents/2024-10/UVMExt_Soil_Fertility_Recommendations_for_Vt_Lawns_7p.pdf

https://vectorportal.com/vector/grass-soil-clip-art/27009

Lawn Integrated Pest Management

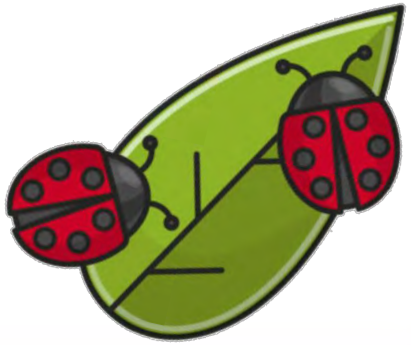
Practice

Physical/Mechanical

- Manual removal
- Cultivation
- Trapping
- **MOWING**

Beneficials / Biocontrols

- Predators, parasites, pathogens
- Competitors, antagonists
- Composts (disease suppression)
- Provide favorable conditions



https://vectorportal.com/vector/ladybug/35148
https://vectorportal.com/vector/gardening/34958
https://flyclipart.com/gardening-rake-royalty-free-vector-clip-art-illustration-rake-clipart-218254

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Lawn Integrated Pest Management

Treat

Biopesticides

- Minerals & Natural Materials
- Soaps & Oils
- Plant Extracts
- Microbes

Conventional

- Synthetic chemicals
  (may be naturally derived)

Only treating pest
vs.
removing cause

http://pngimg.com/download/57865

Lawn Weeds

Grasses

- **Annual bluegrass** –moist soils, seeds, cool season
- **Large crabgrass** –all soils, seeds
- **Quackgrass** –fertile soils, seeds, rhizomes

Broadleaf

- **Purslane** –seeds, root at nodes, annual
- **Common chickweed** –seeds, root at nodes, cool season, annual
- **Slender Speedwell/Creeping veronica/Ground ivy** –few seeds, creeping stems, root at nodes
- **Yellow woodsorrel** –seeds eject
- **Broadleaved plantain** –moist soils, seeds, sprout from roots
- **Dandelion** –all soils, seeds wind disperse

Mary Ellen (Mel) Harte, Bugwood.org #5106062

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Lawn Weed Management Considerations

Annual/Biennial

- Kill before set seed
- Easiest to manage at germinating/seedling stage (spring, fall)
- Target growing points: grasses at soil line
- Target growing points: broadleaves at top and where leaves attach to stem
- Contact herbicides work well above ground

Perennial

- Must kill underground root structure (unless seedling)
- Easiest to manage at germinating/seedling stage
- Systemic herbicides most effective summer/late in season
- Repeated top management may exhaust roots

https://publicdomainvectors.org/en/free-clipart/Question-mark-vector-image/70902.html

Lawn Weed Integrated Pest Management

Prevent

- Black plastic or paper mulch
- Frequent mowing to encourage thick turf, re-seed bare spots
  (low mowing may stress turf)

Practice

- Hand weed young plants before seeds develop (remove root, broken stems)
- Frequent low mowing to limit seed development, reduce flowering

Treat

- Spot treat with selective herbicide (pre-emergent may be option)
- Plant growth regulators may be helpful
- Do not use glyphosate during drought (poor efficacy)

Lawn Diseases

Area

- **Dollar spot** –small, bleached, dew/humidity, warm days, cool nights
- **Brown patch** –3"-3', brown, 85°F with humidity, leaf moisture (often confused with dog urine)
- **Summer patch** –frog eye, 75°-90°F with humidity, warm roots, moist soil
- **Snow mold** –white or red, <60°F most active, snow falls on unfrozen turf, prolonged cool wet weather

Blades

- **Leaf spot diseases** –turf appears yellow/reddish-brown, 50°-90°F, die back from the tip, crown infection "melting out" in summer
- **Powdery mildew** –white-grey powder on surface, yellowing, stunting, decline

Lee Miller, University of Missouri, Bugwood.org #5516163

Lawn Disease Integrated Pest Management

Prevent

- Resistant varieties, mix of species
- Mow only when grass dry, sharp blades (frequent mowing creates susceptible wounds)
- Water deeply during day, avoid overwatering
- Light nitrogen, compost applications
- Avoid thatch, over-fertilization, drought stress

Practice

- Light raking of Grey Snow Mold areas in spring (rarely kills lawn)
- Light infections may recover if temp/humidity ends

Treat

- Fungicides may be used to treat problem areas
  (may be difficult once established)

Lawn Grubs

- Common name for larvae of several different scarab beetles
- C-shape, creamy to yellowish body, brown head, six legs, three instars
- **Symptoms:** brown, dead patches, spongy turf, severed roots, easily peeled back
  - Digging damage from animals eating grubs (moles, skunks, birds)

- Eggs hatch June-August, larvae feed late summer-spring
- Overwinter in soil, adults emerge June-July

USDA ARS , USDA Agricultural Research Service, Bugwood.org #0660086
https://en.wikipedia.org/wiki/Scalopini#/media/File:ScalopusAquaticus.jpg

Lawn Grubs

May/June Beetle
NATIVE

Japanese Beetle	Oriental Beetle	European Chafer
Shiny metallic green, copper-brown wing covers	Mottled gold-black, gold, or black	Light tan to brown
Adults feed on fruit, blossoms, foliage	**Adults** occasionally feed on ornamentals, hide during day	**Adults** do not injure plants

Grubs feed on grass roots and underground stems

Steven Valley, Oregon Department of Agriculture, Bugwood.org #5459361
Michael Reding, USDA Agricultural Research Service, Bugwood.org #5171066
Michael Reding, USDA Agricultural Research Service, Bugwood.org #5171049
Emmy Engasser, Hawaiian Scarab ID, USDA APHIS PPQ, Bugwood.org #5539654

Lawn Grubs Integrated Pest Management

Prevent

- Reduce soil moisture (Japanese Beetles)

Practice

- Encourage **natural predators** and biocontrols (ground beetles, ants, pathogens, parasitic wasps, nematodes)

Treat

- Following inspection
- Treat when grubs small (August-Sept)
- Milky Spore not effective in cooler climates
- Managing grubs will limit mole activity

Lawn Moles, Voles

Moles

- Volcano mounds at burrow entrances, digging injures roots, yellow turf
- Feed on grubs, arthropods

BENEFICIAL

Pine Voles

- Holes at burrow entrances, spongy turf
- Feed on bark, roots, grass

Meadow Voles

- Runways in thatch, shallow tunnels
- Feed on bark, roots, grass
- Require vegetative cover for reproduction

https://en.wikipedia.org/wiki/Scalopini#/media/File:ScalopusAquaticus.jpg
https://www.flickr.com/photos/internetarchivebookimages/19369229271/
https://www.flickr.com/photos/internetarchivebookimages/19369229271/

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Lawn Moles, Voles Integrated Pest Management

Prevent

- Underground barrier or mesh 6 inches deep
- Trunk wraps, screening
- Frequent mowing, cultivation

Practice

- Trapping (**Moles:** scissor and harpoon traps)

Treat

- **Moles:** castor oil repellents, rarely feed on baits
- **Voles:** zinc phosphide (restricted use), baits can be effective

Other Lawn Insects

- **Hairy Chinch Bug** – 1/8", yellowing dead patches, hot dry weather
- **Annual Bluegrass Weevil** – 1/8", yellowing grass stems hollowed out or severed at base
- **Black Cutworm** –individual grass blades chewed/cut off near or just below soil surface, larvae feed at night
- **Sod Webworms** –zig-zag flight, irregular brown patches, feed on grass blades, silk tubes i burrows, larvae feed at night
- **Ants** –**BENEFICIAL** predators of other insects

Nuisance (FYI)

- **Bees, Wasps** –**BENEFICIAL** pollinate, wax, honey, predators; may cause allergic reactions, alarm
- **Fleas** –larvae burrow in soil
- **Ticks** –Nymphs & adults climb vegetation to seek hosts, **Arthropods** (not insects)

Other Lawn Insects Integrated Pest Management

Identify

- Light traps, scout thatch (frass pellets, chewing)
- Core sample floatation method, soapy water will move burrowed larvae to surface

Prevent

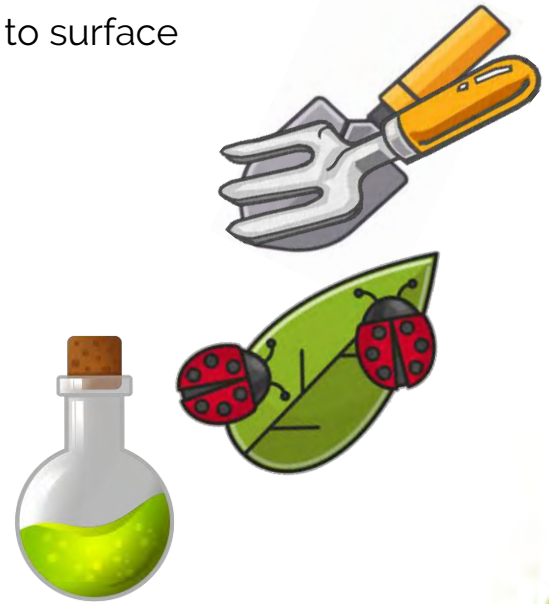
- Resistant varieties, endophytes
- Avoid thatch, over-fertilization, drought stress

Practice

- **Natural predators and biocontrols** (ground beetles, wasps, mites, nematodes, *Beauvaria bassiana*, *Bacillus thuringiensis*)

Treat

- Target adults before egg laying begins
- Target night-feeding larvae with evening/night applications
- Follow label application directions for irrigation and mowing



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Other Lawn Vertebrate Pests & Integrated Pest Management

- **Geese** –feeding, soil compaction/erosion, feces, feathers, aggression
- **Dogs** –urine injures plants (concentrated salts), chewing, digging
- **Deer** –feeding, trample grass, carry ticks, automobile collisions

Prevent

- Habitat Modification
- Exclusion

Practice

- Hazing/scaring

Treat

- Repellents

https://commons.wikimedia.org/wiki/File:American_Foxhound_and_Labrador_Retriever_playing.jpg

Other Lawn Vertebrate Pests Considerations

- **Most states have specific laws for nuisance wildlife management**
  - May require certification and/or licensing
  - May require notification of health authorities (rabies, disease vectors)
- Endangered and threatened species (federal and state laws)
- Game species (state laws)
- Local regulations (protection, relocation)

https://commons.wikimedia.org/wiki/File:Stan_T._rex_in_Oslo_white_background.jpg

Pesticide Reminders

The label is the LAW (federal & state)

- All pesticides must be applied consistent with their labeling
- Read the label and apply properly

How you apply, spill, dispose affects everything around you including:

- Nontarget plants, Bees and other beneficial insects, Fish, Wildlife and Livestock

RISK = TOXICITY x EXPOSURE

Considerations

- Personal Protection Equipment (PPE), application equipment
- **Phytotoxicity** risks

https://publicdomainvectors.org/en/free-clipart/Question-mark-vector-image/70902.html

Pesticides and Honeybees

- Check labels for specific bee hazards and select pesticides that are least harmful to foraging bees
- Avoid formulations most harmful to bees
  - Dusts are carried back to the hive
- Avoid applications to crops in bloom
- **Apply at dawn or dusk to avoid bees**

Background
- Perspectives
- Definitions

Approaches
- Function
- Groundcovers

Maintenance
- Installation
- Pest Management

Resources

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Getting More Information

Getting More Information

- Garden Centers, Nurseries
- Extension Agents
- Vermont Agency of Agriculture

Online Pesticide Label Databases

- http://www.cdms.net
- http://agrian.com

Lawns

- White Grubs (Family Scarabaeidae): A Serious Lawn Pest (PDF) *(June 2023)*- Margaret Skinner, UVM Extension Entomologist
- Buying Grass Seed - Grass Species Recommendations - Maine.gov
- What's Wrong With My Lawn - UMass Amherst
- New England Regional Nitrogen & Phosphorus Fertilizer & Associated Management Practice Recommendations - For Lawns Based on Water Quality Considerations (PDF)
- Soil Fertility & Fertilization Guidelines for Lawn Turf in Vermont (PDF) - Sid Bosworth, UVM Extension Professor
- Home Lawn & Garden Lawn Fact Sheets - UMass Amherst
- Lawn Renovation & Establishment (PDF) - created by UVM Extension Master Gardener Helpline Volunteers
- Lawn Management in the Fall (PDF) - Sid Bosworth, UVM Extension
- Moles in the Lawn, Control - Iowa State University
- White Grub Control in Turfgrass - Iowa State University
- Moles: Damage Management - Iowa State University
- Turfgrass - Improving the environment one turf at a time - Cornell Cooperative Extension
- Grubs In Your Lawn - Cornell Cooperative Extension
- Ants in Lawns - University of Massachusetts Amherts
- Weeds and Your Lawn - Cornell Cooperative Extension
- White Grubs (Family Scarabaeidae): A Serious Lawn Pest (6/23) (PDF) - Margaret Skinner, UVM Extension

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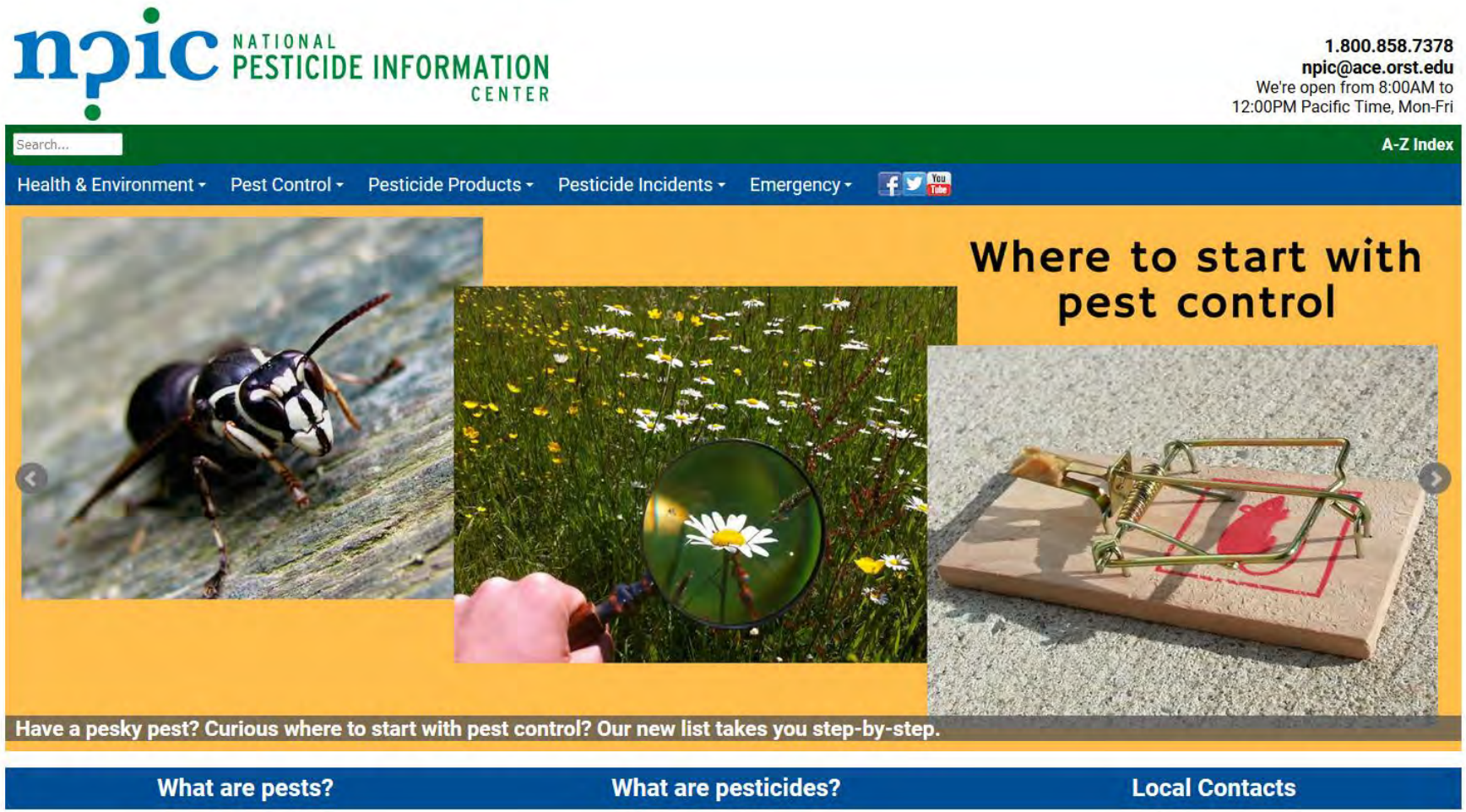

http://npic.orst.edu/

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EXTENSION / PESTICIDE SAFETY EDUCATION PROGRAM

The UVM Pesticide Safety Education Program (PSEP) works closely with the Vermont Agency of Agriculture, Food & Markets (VAAFM) to provide education resources for current and prospective pesticide applicators, ensuring proper and legal use of pesticides that reduces risk to human health and the environment.

According to the law, a pesticide is any substance "intended for preventing, destroying, repelling, or mitigating any pest." This includes insecticides, fungicides, herbicides, rodenticides, natural and biological pesticides, repellents, disinfectants, and others. (NPIC)

Certification

Anyone in the state of Vermont who uses, supervises, recommends, or sells pesticides and/or trains Worker Protection Standard handlers/workers may be required to take and pass the CORE exam and all appropriate category exams to become certified. Certification is administered by the Vermont Agency of Agriculture, Food & Markets to ensure that pesticides are used in a proper and legal manner.

- Do I Need To Be Certified? Flowchart (PDF)
- Which Certification Do I Need? Flowchart (PDF)
- How Do I Become Certified? (PDF)

Purchase Certification Manuals and Download Inserts (VAAFM)

Pesticide Training

Online Exam Study and Recertification Credit Courses

Resources to help study for pesticide applicator exams and/or to provide recertification credits for certified pesticide applicators. Open to the general public and certified pesticide applicators.

GO TO ONLINE COURSES OVERVIEW

Presented by University of Vermont Extension Pesticide Safety Education Program and the Vermont Agency of Agriculture, Food & Markets.

https://go.uvm.edu/psep

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Thank You!

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