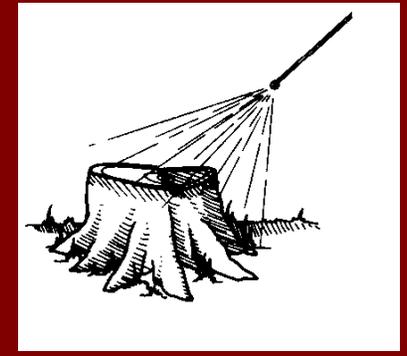
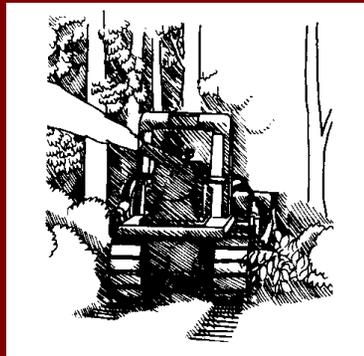
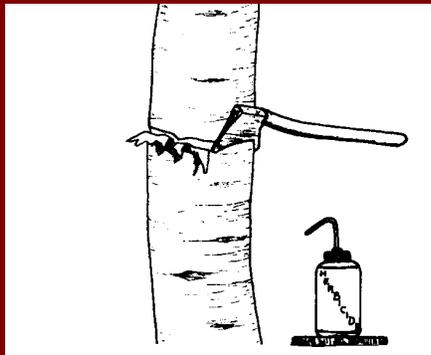


# Herbicides and Forest Vegetation Management

PA Forest Web Seminar Center

Webinar

January 11, 2011



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Penn State Cooperative Extension



# What We'll Cover

- Competing Plants
  - What are they, problems, issues, concerns
- Control
  - Integrated vegetation management (IVM)
  - Focus on Chemical control
- Herbicide application methods
- Herbicide usage and forestry applications

- Competing Plants – Interfere with the establishment and growth of desirable tree seedlings primarily by casting dense shade on the forest floor.



Interfering Plants

# Common Competing Plants of PA



American Beech



Striped Maple

A photograph showing a large, dense field of Hay-scented Ferns (Dryopteris sp.) in a forest clearing. The ferns are bright green and fill the foreground and middle ground. In the background, there are several tall, slender trees with green foliage, suggesting a forest setting. The lighting is natural, and the overall scene is lush and green.

# Hay-scented Fern



**Bracken Fern**

A photograph of a forest clearing. The foreground is dominated by tall, green grasses and several large, fallen tree trunks. The background consists of a dense forest of tall, thin trees with green foliage. The sky is visible through the canopy, appearing overcast. A white rectangular box with black text is overlaid on the right side of the image.

# Grass and Sedge

# Blueberry (*Vaccinium* spp.)





# Mountain Laurel



Grape Vine



Japanese Barberry

# Undesirable and Low Quality Trees



# Competing Plants

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- Limit Regeneration Development
- Limit Species Diversity
- Limit Future Timber Value
- **Limit Wildlife Habitat Diversity**



# Understanding the Competing Vegetation Problem

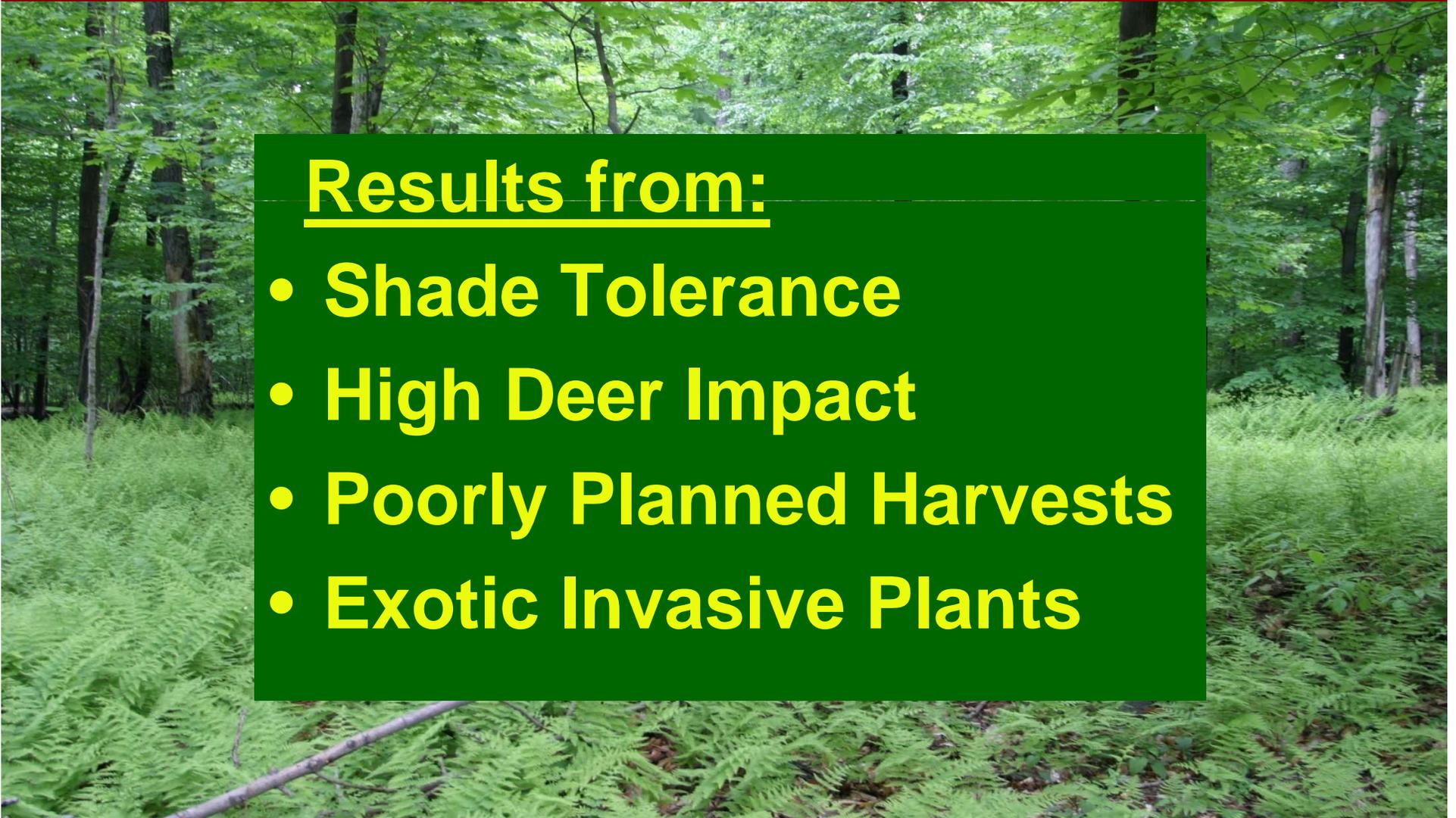


**Why are these plants such a problem today when they weren't at the turn of the last century?**

# Understanding the Competing Vegetation Problem

## Results from:

- **Shade Tolerance**
- **High Deer Impact**
- **Poorly Planned Harvests**
- **Exotic Invasive Plants**



# 1. Shade Tolerance

- Partially harvested forest provides light conditions that foster the growth of competing vegetation
- Most competing vegetation is shade tolerant



## 2. Deer Browsing Impacts

- Selective browsing by deer effects tree species composition
- Occurs over a range of deer densities
  - Impact is a function of deer density and landscape forage availability

### Highly Preferred Species:

oak, sugar maple, ash and yellow poplar

### Intermediate in Preference:

black cherry

### Low in Preference:

beech, striped maple, ironwood, blueberry, laurel, ferns and most invasive plants



### 3. Poorly Planned and Executed Timber Harvests

**“High Grading”**

**“Selective Cutting”**

- Leaves undesirable species  
and trees of low commercial  
value

Taking the “BEST” and  
leaving the “REST”



## 4. Exotic Invasive Plants

- A plant which grows rapidly and spreads aggressively
- Displace our native plants
- Trees, shrubs, vines, grasses, and herbs

### Reproduce prolifically

Mature quickly

Produce large number of seeds

Sprout easily

### Spread aggressively over large areas

By seeds, roots, and shoots

Seed disperses from parent plant

### Difficult to control

Introduced either accidentally or on purpose far from native habitat and natural controls



# How Much is Too Much?

- When is competing vegetation a problem?
  - Exotic Invasives: If you have any!
  - Natives: If 30% or more of the area is stocked with competing plants then:
    - Adequate desirable regeneration is not likely to develop
    - Competing plants are likely to **dominate** understory

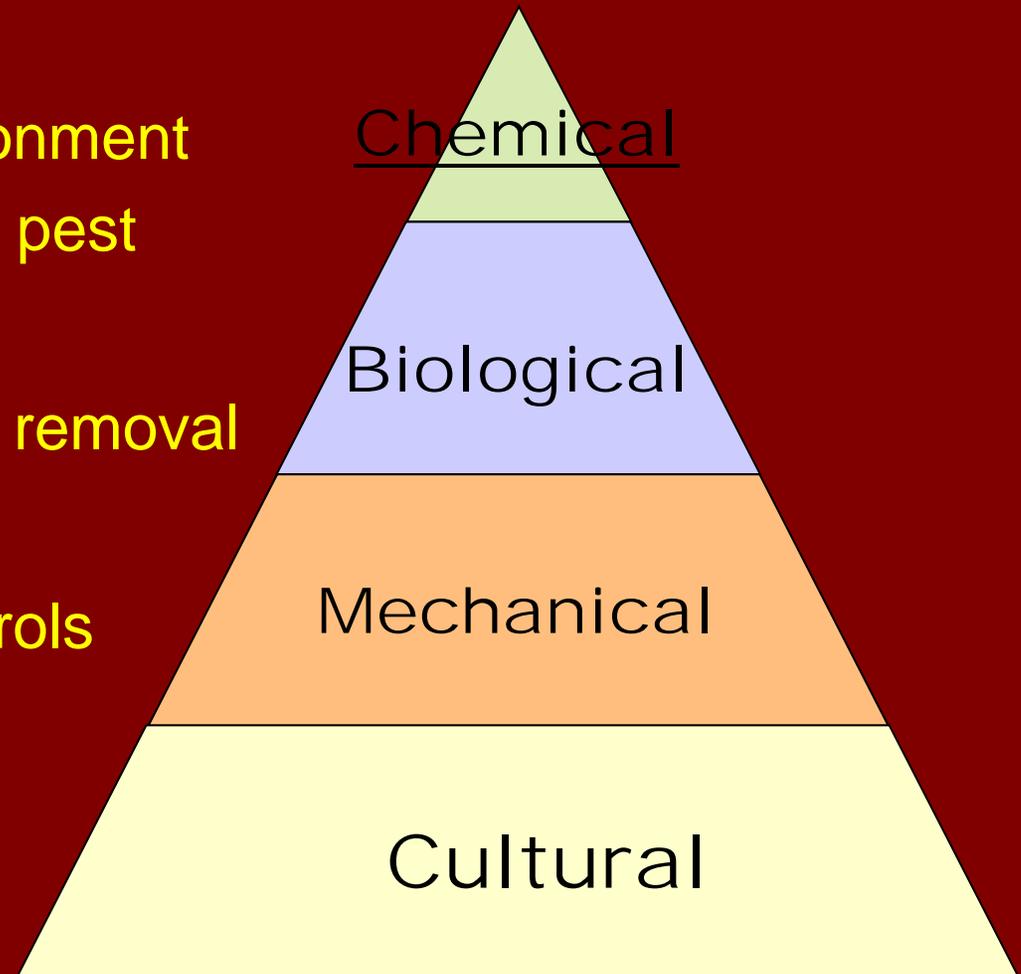
**>30% of area stocked with competing plants**



# “Control”

## Integrated Vegetation Management (IVM)

- Cultural
  - Making the environment unsuitable for the pest
- Mechanical
  - Hand or machine removal
- Biological
  - Natural pest controls
- Chemical
  - Pesticides



# Cultural Control

## “Indirect” Weed Management

- Enhance the growth of desirable plants
  - Proper harvesting practices
  - Reduce deer impact
- Prevent the spread of undesirable plants
  - Eliminate seed sources
  - Plant natives
  - Reduce seed spread
    - Clean equipment
    - Stop soil movement
  - Minimize disturbance



# Mechanical Control

## – Hand removal

- Pulling
- Cutting

## – Mowing



# Biological Control

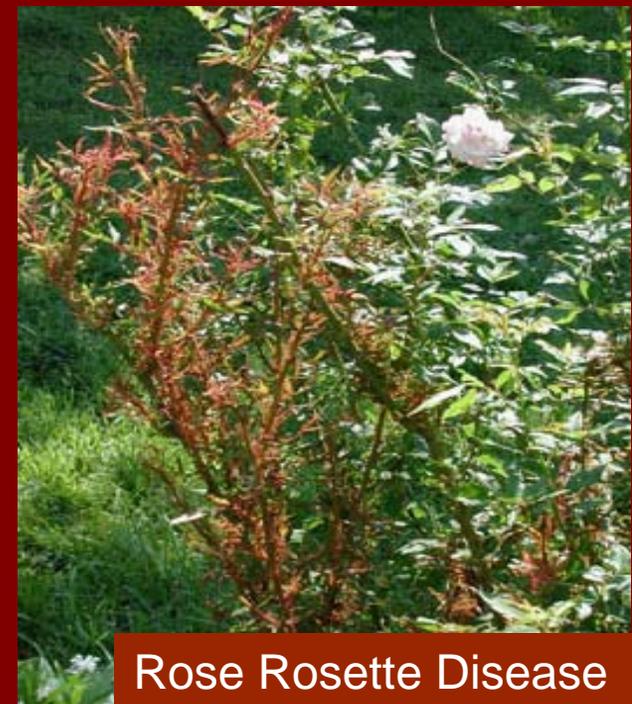
## Natural Pest Controls

- Insects and Diseases
- Grazing by livestock



Ailanthus Wilt

## “Goats in the Woods Project”



Rose Rosette Disease

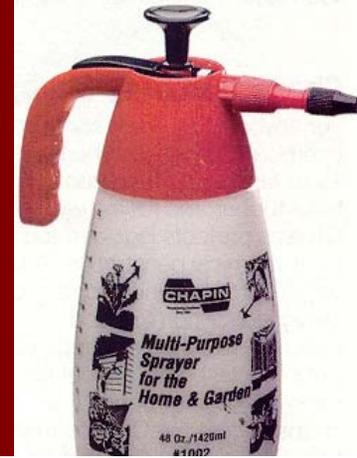
# Chemical Control

## Herbicides

- Productive
- Economical
- Low Risk
- Effective
- Selective
- *Necessary???*



**Control the competing vegetation and then let in the light**



# How are forestry herbicides applied?



# Application Techniques

- Foliar Spot and Broadcast



- Basal Bark



- Frill Girdle (Hack and Squirt)



- Stem Injection



- Stump Treatment



# Application Techniques

## Foliar Spot Applications

### Backpack Sprayer



Do not spray to the point of runoff.



Two years following  
herbicide treatment



# Foliar Broadcast Applications

## Airblast spray equipment



## Radiarc Sprayer



# Airblast Spray Equipment

Sprays both ground vegetation and understory trees up to 20 feet high



Treats a swath 40 to 80 feet wide



**ATV and truck  
mounted sprayers**



# Basal Bark Treatments

Used for treating thin barked trees generally when they are less than 6" in diameter.



Wet lower 12"-18" of trunk completely around tree.



Basal bark applications can be applied at any time of year, including winter months.

# Frill Girdle (Hack & Squirt) and Stem Injection

Cuts must penetrate through the bark into living tissue of cambium layer.

## Hatchet & Spray Bottle



Used to control individual trees generally over 5 inches in diameter



# Stump Treatment

Used for sprout control on cut hardwood stumps.

In general, herbicide must be applied to cambial area of freshly cut surface immediately after cutting.



# Forestry & Herbicide Usage

- Increase regeneration success
  - Site preparation
    - Natural and artificial regeneration
  - Release
    - Reducing competition
    - Increased seedling growth and survival
- Timber Stand Improvement
  - Removing non-crop trees and vines
  - Pre-commercial thinning
    - Reduce stocking levels
    - Increase growth rate
    - Shift species composition



**“The objective of herbicide use in forestry is not to achieve the complete weed control routine as in row crop agriculture but rather to provide a temporary growth advantage (months to a few years) for the crop trees over their competition”**

(Miller and Miller 2004)

# Wildlife & Herbicide Usage

- Used to manipulate wildlife habitat
  - Creation of snags and down course woody debris
  - Management of vertical and horizontal structure
  - Restoring native plant communities
  - Controlling exotic plant species



Triclopyr

2,4-D?

Glyphosate?

Imazapyr?

Metsulfuron methyl?

# What Do I Use?

Sulfometuron methyl?

Fosamine?

Hexazinone?

Picloram?

Dicamba?

Clopyralid?

# What to Use

- **Labeled for Site**
  - Natural and production forests
- **Least Toxic**
  - Consider signal word
    - Caution, Warning, Danger, Danger/Poison (Skull and Crossbones)
- **Use Classification**
  - General Use or Restricted Use
- **Selectivity**
  - Refers to the resistance various classes of plants have to an herbicide
- **Activity**
  - Refers to how the product enters the plant
    - Foliage, stems, and/or roots

# What to Use

- Foliage Applications

- Glyphosate (ex. Accord Concentrate) – controls numerous species, herbaceous and woody
- Sulfometuron methyl (ex. Oust XP) – Ferns & grass

**Glyphosate**



**Sulfometuron methyl**

# What to Use

- Basal Bark Applications

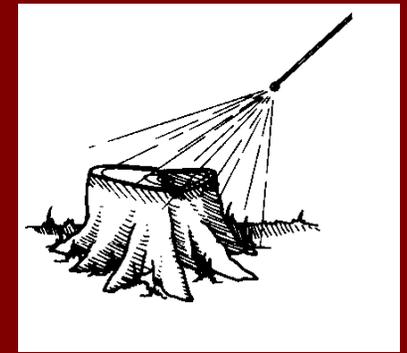
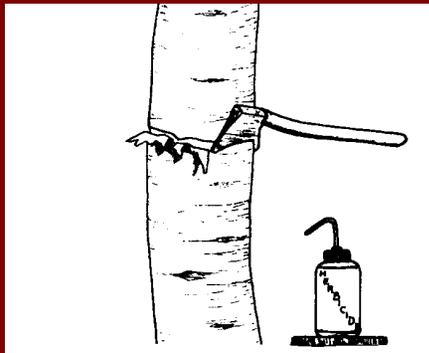
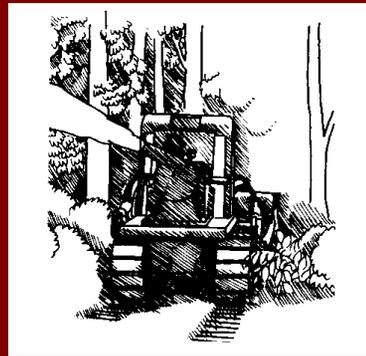
- Triclopyr (ex. Garlon4) – Used on thin barked trees up to 6 inches in diameter

**Triclopyr**



Trade names are used in this presentation only to give specific information. Penn State Cooperative Extension does not endorse or guarantee any product and does not recommend one product instead of another that might be similar.

# Choosing the Right Forestry Herbicide and Application Method



# Herbicide Applications

## Consider:

- Stem diameter
- Number of Stems
- Number of acres
- Time of year
- Non-target species



Ensure lowest risk, most efficient, and most cost-effective application is selected

# Herbicide Treatment Guidelines

- Use most effective herbicide for controlling target species
- Use herbicide at lowest rate that will give optimum control
- Follow prescribed application methods
- Apply herbicide at optimum time of year
- Follow all label precautions
- Be patient!



**Always read and follow  
the label before applying  
any pesticide.**

# Penn State Natural Resources Extension Forest Vegetation Management

<http://fvm.cas.psu.edu>

## Penn State Vegetation Management Research

<http://vm.cas.psu.edu>



A photograph of a forest floor. The foreground is dominated by a dense carpet of bright green ferns. In the middle ground, there are several large, bushy shrubs with clusters of small, light pink or white flowers. The background consists of a dense stand of tall, thin trees with green foliage, creating a canopy effect. The overall scene is lush and green, suggesting a healthy forest environment.

# Herbicides and Forest Vegetation Management

Controlling Unwanted Trees, Brush, and  
Other Competing Forest Vegetation

PENNSSTATE



College of Agricultural Sciences  
Agricultural Research and Cooperative Extension

A photograph of a forest floor. The ground is covered with a mix of green, leafy plants and brown, fallen leaves. Some thin, dark branches are scattered across the scene. The overall appearance is that of a natural, undisturbed woodland area.

# QUESTIONS?

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