

Pesticide Applicator Certification Manuals

Collaboration Opportunity

Presentation Outline:

1. Who I am
2. Importance of Certification Manuals
3. National Manuals in print
4. Public Health manual and the PSEP IMI website
5. Forest Pest Management Manual for Participating SE States
6. Collaboration Teams and Basecamp
7. Discussion

Wayne Buhler, PhD

Professor and Pesticide Safety Extension Specialist, NC State

- MS and PhD, Entomology, Purdue Univ.
- PSEP Coordinator, NC State for 24 years!
- AAPSE, PPDC, CTAG 1.0
- Coordinate PSEP-IMI Resources website and pesticidestewardship.org.
- NPSEC Educational Facilitator for IPM in PSE

My introduction to PSE at the **1998 AAPCO meeting**

“There are 50 states and 50 ways of doing things. But you need not worry, in this business, we shamelessly steal from one another”

M. Grodner, LSU



Levi Bear Kunasek



Jett Reeves Biddle

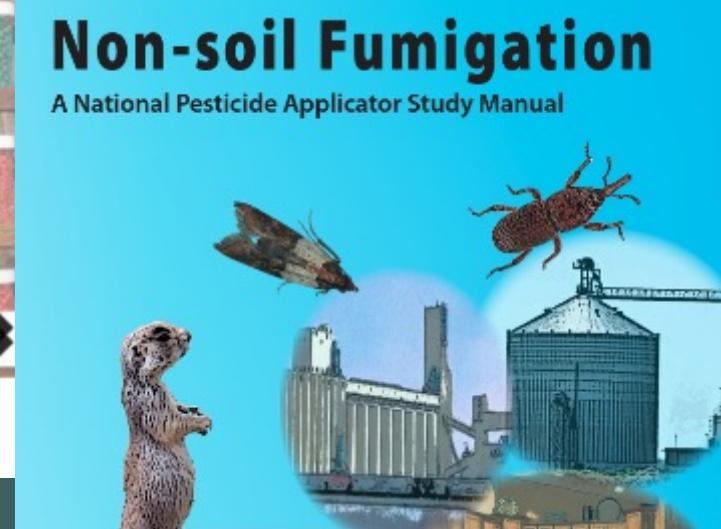
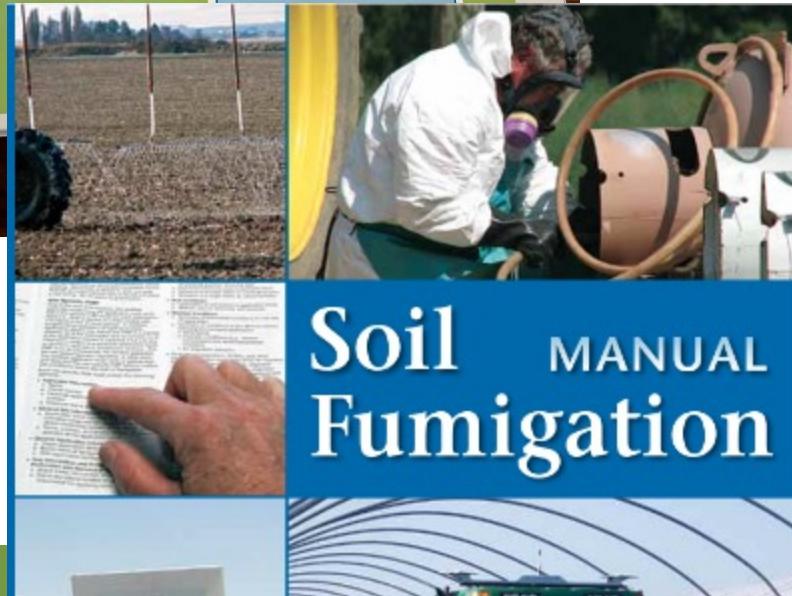
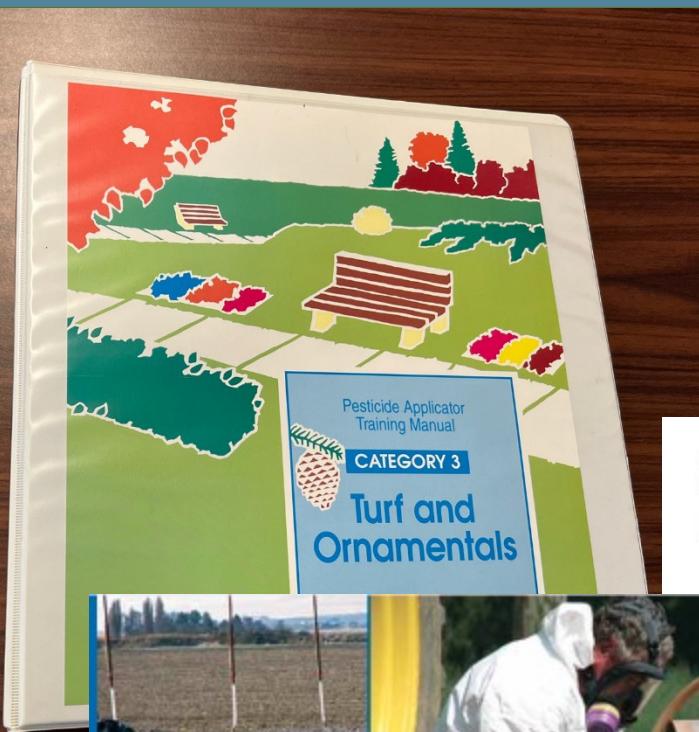


The Importance of Good Certification Manuals

- ❑ Chief and initial means of communicating pesticide safety and use
- ❑ “Introduction” to the state PSEP, or *bigger* yet, Cooperative Extension (1st impressions!)
- ❑ Basis for certification exams
- ❑ Reflective of the industry/knowledge base in the state
- ❑ For many applicators, it’s the “only book on the shelf”
- ❑ Revenue generator
- ❑ Reciprocity criterion?



National manuals from AZ...NASDARF...PERC



PSEP-IMI Resources Website

psep.ces.ncsu.edu (password protected)

🔒 psep.ces.ncsu.edu

North Carolina Stat... <https://www.youtube.com> WRS Main Menu Welcome | Person... GMAIL Dictionary.com | Fin... NC Pesticide Safety... Grammar Girl :: Qui... »

PSEP - IMI Home Contact Login | Request access

Welcome to the PSEP-IMI Resources Website:

The Pesticide Safety Education Program Improvement and Modernization Initiative (PSEP-IMI) application created to strengthen Land Grant University Pesticide Safety Education Programs (PSEP).

[Request access »](#)

About the PSEP-IMI Resources Website

The PSEP-IMI Resources Website is a national repository of Land Grant University pesticide safety education resources created by pesticide safety educators or partners in affiliated programs at Land Grant Universities. A major goal of the PSEP-IMI is to strengthen Pesticide Safety Education Programs by improving the quality, consistency, and accessibility of applicator training materials and classes, as well as passing rates and scores on certification tests. This website will help achieve this goal by expanding the availability of educational resources to PSEPs throughout the US. The site is password-protected and accessible only to educators affiliated with Pesticide Safety Education Programs at Land Grant Universities. User identity is verified before access is granted.

Regional Compilers:

- **Tana Haugen-Brown** (lead) and **Dean Herzfeld, Ph.D.** (advising), *West University of Minnesota*
- **Chrissy Kaminski** (lead) and **Mary Ann Rose, Ph.D.** (advising), *Midwest Ohio State University*
- **Ed Crow** (lead) and **Kerry Richards, Ph.D.** (advising), *Northeast Pennsylvania State University*
- **Demi Hoffstetter** (lead) and **Don Renchie, Ph.D.** (advising), *South Texas A&M University*

PSEP-IMI Resources Website

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PSEP - IMI Home Resources How To Contact

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Resources 910 total

Sort results: Date: New to Old ▾

- Managing and Reporting Pesticide Spills/Manejo y Reporte de Derrames de Pesticidas
- Transporting Pesticides Safely/Transporte de Pesticidas de forma Segura
- Storing Pesticides Safely/Almacenamiento Seguro de Pesticidas
- Personal Protective Equipment (PPE)/Equipo de Protección Personal
- How Pesticides Enter Your Body/Cómo Entran los Pesticidas a tu Cuerpo
- Heat-Related Illnesses: Symptoms, First Aid & Prevention/Enfermedades relacionadas con el Calor: Síntomas, Primeros Auxilios y Prevención
- Emergency First Aid for Pesticide Poisoning/Primeros Auxilios en caso de una Emergencia de Intoxicación por Pesticidas
- Cleaning Pesticide-Contaminated Clothing/Lavado de Ropa Contaminada por Pesticidas
- Disposing of Pesticides and Pesticide Containers Safely/Cómo desechar de manera segura los pesticidas y los envases de pesticidas
- Protecting Pollinators/Protegiendo a los Polinizadores
- Dealing With Pesticide Spills English version
- Que Se Debe Hacer cuando hay Derrames de Pesticidas
- Handling Pesticides Safely
- El Manejo Seguro de Pesticidas
- Keeping Yourself Safe during Pesticide Applications

Search title, series, tag or author

States

Alabama Arkansas California Florida Georgia
Indiana Iowa Kansas Kentucky Louisiana
Michigan Minnesota Mississippi Montana
Nebraska Nevada New Jersey New York
North Carolina North Dakota Ohio Oklahoma
Pennsylvania South Carolina Tennessee Texas
Utah Virginia Wisconsin

Content Type

Form Manual Presentation Story Video
External URL Information Leaflet Other

Categories

Labeling
 Laws and Regulation
 Pesticide Properties
 Human Health
 PPE
 Pesticides in the Environment
 Handling
 Application
 Resistance
 Communication
 Pest Mgt Methods
 Pesticide Types
 Pest Types

PSEP-IMI Resources Website

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-  [Public Health Pest Management: Chapter 01 - Overview of Pesticide Safety Principles and Legal Requirements.](#) 
-  [Public Health Pest Management: Chapter 02 - Pests and Diseases.](#) 
-  [Public Health Pest Management: Chapter 03 - Mosquitoes.](#) 
-  [Public Health Pest Management: Chapter 04 - Bed bugs](#) 
-  [Public Health Pest Management: Chapter 05 - Lice](#) 
-  [Public Health Pest Management: Chapter 06 - Fleas](#) 
-  [Public Health Pest Management: Chapter 07 - Mites and Ticks](#) 
-  [Public Health Pest Management: Chapter 10 - Spiders](#) 
-  [Public Health Pest Management: Chapter 08 - Cockroaches](#) 
-  [Public Health Pest Management: Chapter 09 - Flies](#) 
-  [Public Health Pest Management: Chapter 11 - Bees, Wasps, and Ants](#) 
-  [Public Health Pest Management: Chapter 12 - Rodents](#) 
-  [Public Health Pest Management: Chapter 13 - Application Equipment and Calibration](#) 
-  [Public Health Pest Management: Glossary](#) 
-  [wood preservation manual](#) 
-  [Herbicides: How Toxic Are They?](#) 
-  [Wood Preservation: A Pesticide Applicator Certification Training Manual for Wood Treaters \(Low-Resolution PDF\)](#) 
-  [Wood Preservation: A Pesticide Applicator Certification Training Manual for Wood Treaters \(Print Quality PDF\)](#) 

[External URL](#) [Information Leaflet](#) [Other](#)

Categories

- Labeling
- Laws and Regulation
- Pesticide Properties
- Human Health
- PPE
- Pesticides in the Environment
- Handling
- Application
- Resistance
- Communication
- Pest Mgt Methods
- Pesticide Types
- Pest Types
- Applicator Categories
- Target Audience

Keywords

- wood preservation 3
- Ornamentals 2
- Certification 2
- Turfgrass 2
- wood treatment 2
- pest identification 1
- small grains 1
- Citrus Orchards 1
- pole remediation 1
- calibration 1
- Spanish 1
- calculations 1
- Stored grain 1
- Cotton 1
- dogs 1
- excel worksheet 1
- Juniper 1
- musk thistle 1

PSEP-IMI Resources Website

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Photos and Tables

We have provided this document in word format for ease of editing purposes. As you read through each chapter, you'll find the areas where each figure and table should be inserted labeled. All figures and tables for chapter three can be found here: <http://go.ncsu.edu/public-health-ch03>. If you experience technical difficulties accessing figures and images, please copy the web address and paste into Google Chrome browser.

PSEP-IMI Resources Website

psep.ces.ncsu.edu (password protected)

- Discuss your role in pollinator protection as a licensed pesticide applicator
- Explain timing of pesticide applications for mosquito control and why it is so important
- List two options for biological control of mosquitoes and explain both

Life Cycle & Behavior

Mosquitoes are both an annoyance and a potential health risk to humans and other animals. Their bothersome biting can diminish the quality of outdoor activities. As potential carriers of disease organisms, they pose a risk both to people and domestic animals. Mosquito-borne diseases such as malaria and yellow fever, are no longer a health concern in the U.S., but persist elsewhere in the world. Mosquitoes are linked to the more recent transmission of West Nile virus in the U.S. They also can transmit parasites to domestic animals, including potentially lethal heartworm to dogs.

Female mosquitoes bite humans and other animals to draw blood needed to produce eggs. Males do not feed on blood but live only on nectar and other plant juices. Females also use nectar for metabolism and to power their flight.

Insert Figure 3.1

Mosquito life cycle illustration. Illustration by: Garo Goodrow, Artwork by Garo

Mosquitoes need water to breed, and have complete metamorphosis. Three of the four stages of the mosquito's life cycle – egg, larva, and pupa – must be completed in water, with only the fourth, or adult, stage characterized as a flying insect. Most mosquitoes are active between dusk and dawn, although some species will bite during the daytime. Mosquitoes that find breeding places in water-filled containers around homes tend to be active during the day. Some species of mosquitoes can survive cold winter weather as adults by entering into a hibernation-like state called diapause. Females do not feed or reproduce during this time, instead they live off fat stored in their bodies. Mosquitoes in diapause can overwinter for several months if they find warm places to stay, like storm drains, so they do not freeze.

Chapter 3: Mosquitoes

Original content compiled by: Michael Waldgovel and Eleanor Spicer

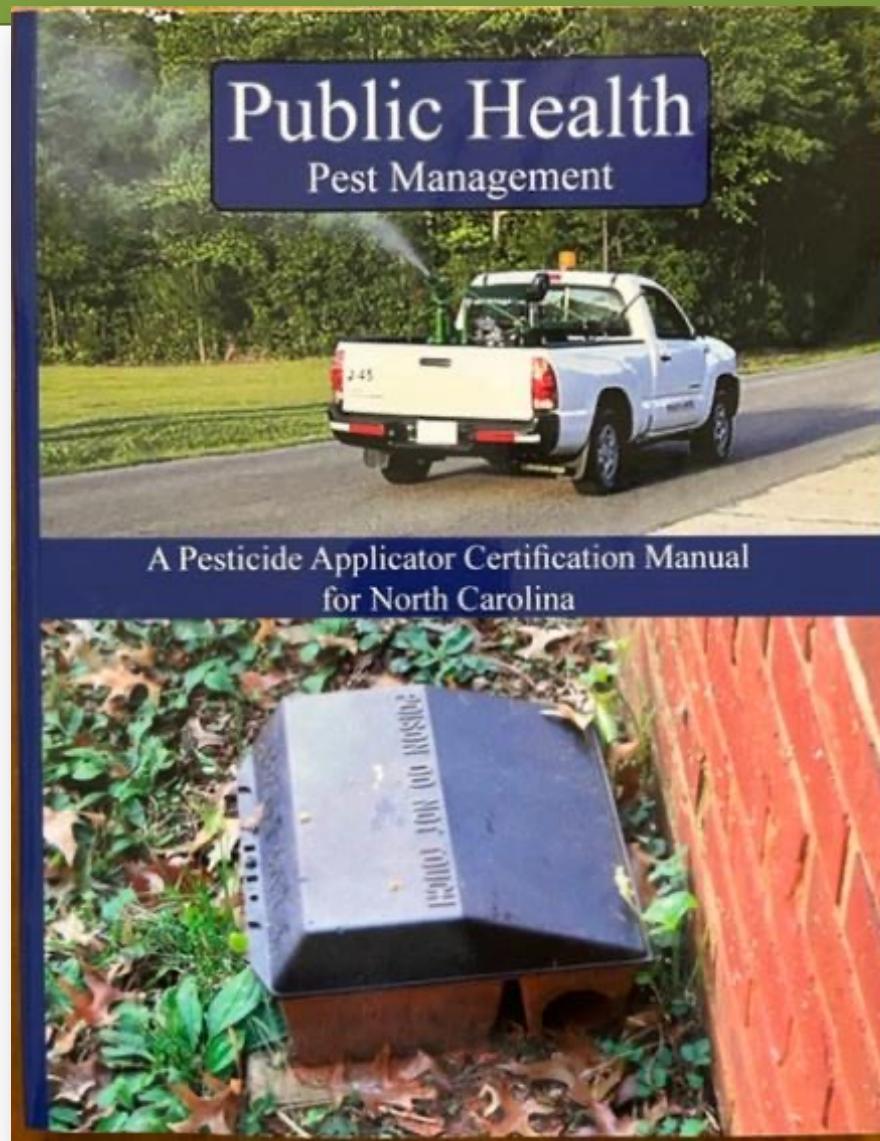


Learning Objectives:

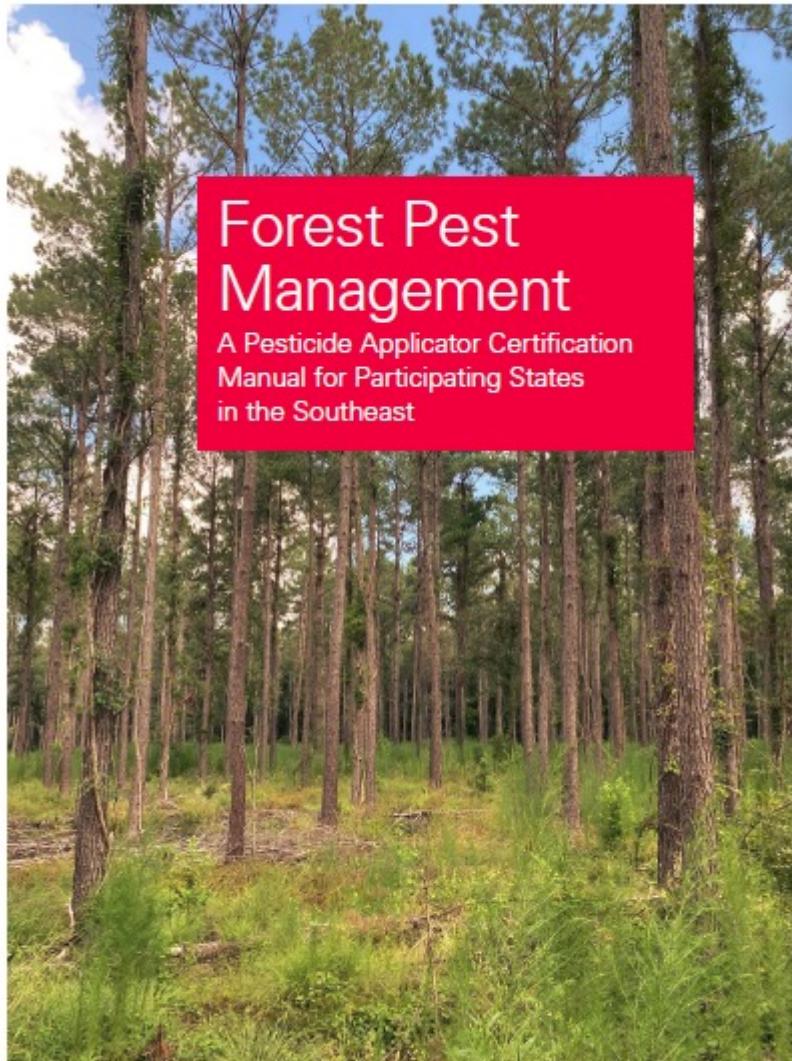
After studying this chapter, you should be able to:

- Describe the stages in the life cycle of a mosquito
- Explain the need for water in mosquito reproduction
- Explain the behavior of each stage in the life cycle
- List the differences and similarities you will find with breeding sites
- List three commonly used mosquito surveillance options and explain the differences with each
- Discuss arbovirus and how it affects public health
- Explain arbovirus surveillance and all the factors this type of surveillance monitors
- Explain the role of sentinel birds in arbovirus detection
- Discuss three different pesticide treatment options and the benefits of each
- Discuss the differences between ULV and fogging
- List two methods to reduce drift when making pesticide applications for mosquito control

NC Public Health Certification Manual



A manual for Forest Pest Management in the SE



Forest Pest Management

A Pesticide Applicator Certification Manual for Participating States in the Southeast

Contents

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Chapter 4. Forest Disease Management
Chapter 5. Abiotic Disorders and Stressors
Chapter 6. Forest Wildlife Management
Chapter 7. Application Methods and Equipment
Further Readings
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Appendices
Appendix A. Additional State Agency Contacts for Forestry and Wildlife
Appendix B. Forest Types of the Southeastern U.S. by State
Appendix C. Key Forest Pests in the Southeastern U.S. by State

A manual for Forest Pest Management in the SE

Overview

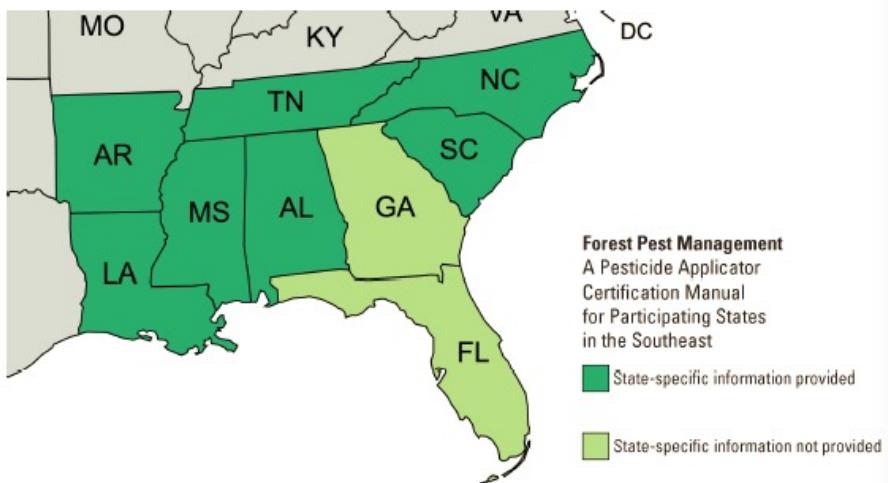


Image credit: <https://mapchart.net/usa.html>; CC BY-SA 4.0

Manual Purpose

The purpose of this manual is to prepare pesticide applicators for the Forest Pest Control certification examination in the states of Alabama, Arkansas, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee. You will need to know and understand the information presented in this manual when applying pesticides in a forested system. Although pest species and management practices may be similar to Christmas tree production, this manual and the Forest Pest Control certification exams administered by the states mentioned above do not include this crop. Instead, Christmas tree growers are considered private pesticide applicators.

Manual Coordinators

Emily Mueller, Ph.D., and Wayne Buhler, Ph.D., Pesticide Safety Education Program, North Carolina State University

Technical Authors

Colby Lambert, North Carolina Cooperative Extension—Harnett County Center

Kelly Oten, Ph.D., Department of Forestry and Environmental Resources, North Carolina State University

Contributing Authors

in alphabetical order

Kim Brown, Pesticide Safety Education Program, Louisiana State University AgCenter

Wayne Buhler, Ph.D., Pesticide Safety Education Program, North Carolina State University

Lois Connington, Pesticide Safety Education Program, Mississippi State University

Darrell Hensley, Ph.D., Extension Pesticide Safety and Education Program, University of Tennessee

Tamara Marcum, Extension Pesticide Safety and Education Program, University of Tennessee

Gene Merkl, Pesticide Safety Education Program, Mississippi State University

Katie Moore, Pesticide Safety Education Program, Clemson University

Emily Mueller, Ph.D., Pesticide Safety Education Program, North Carolina State University

Ples Spradley, Pesticide Safety Education Program, University of Arkansas

Sonja Thomas, Ph.D., Pesticide Safety Education Program, Auburn University

Editing and Design

Lois Connington, Pesticide Safety Education Program, Mississippi State University

Emily Mueller, Ph.D., Pesticide Safety Education Program, North Carolina State University

Wayne Buhler, Ph.D., Pesticide Safety Education Program, North Carolina State University

Jill Steffey, Technical Editor

Southern Pines Land and Timber LLC, Front Cover Image

We would like to thank the following people for their helpful inputs in reviewing the text:

Becky Barlow, Ph.D., School of Forestry and Wildlife Sciences, Auburn University

Wayne K. Clatterbuck, Ph.D., Department of Forestry, Wildlife and Fisheries, University of Tennessee

A manual for Forest Pest Management in the SE

Chapter 1: Forests of the Southeastern U.S. and Their Management

*Note: Important terms are shown in **bold text** and defined in the Glossary.

LEARNING OBJECTIVES

By the end of this chapter, you should be able to do the following:

- compare the differences between natural and managed forest systems
- state the basic principles in forest integrated pest management
- understand pesticide usage and its importance in forest management
- explain the difference between
 - primary and secondary pests
 - non-native and native species
 - invasive and non-invasive species
- define tree stand improvement
- list and describe four tree stand improvement techniques

Forests provide many important benefits in the Southeastern U.S. They stabilize the climate, enrich the soil with nutrient recycling, serve as a natural storm water management system, and provide recreation, wildlife habitat, timber, fiber products, and property value enhancements. Figure 1.1 is a visual representation of North America's eastern deciduous forest ecosystem. This forest system spans north and south across 26 states from Florida to southern Canada. From east to west, it extends from the Atlantic coastline as far west as Texas and Minnesota.

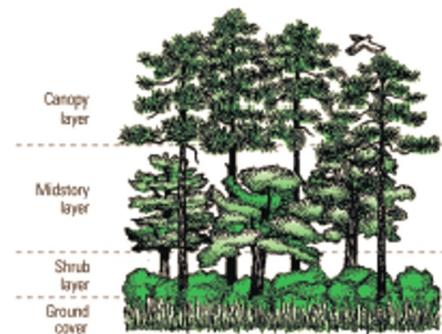


Figure 1.1. A forest with well-developed vertical structure includes ground cover, shrub, midstory, and canopy layers. Image credit: Developing Wildlife-Friendly Pine Plantations, Woodland Owner Notes, North Carolina State Extension, [WIN-38](#).

of overtopping trees. Unless these trees are released from shading, they will struggle to survive and likely die.

If chemical site preparation was not performed or was unsuccessful, woody release (removal of undesirable woody species) should be performed within the initial two to five years to control hardwoods in pine stands. After this point, the competitive impact of undesirable stems has a permanent negative effect on pine growth and rotation length (length of time until trees are harvested). Later release operations should be implemented in conjunction with thinning or another TSI technique.

Exercise caution when releasing desirable hardwood trees in hardwood stands because herbicide sprays can kill both desirable and undesirable hardwoods. Injection is the most appropriate method for release in hardwood stands. **Flashback** (described in Chapter 2) is a possible outcome of injected herbicides, so use caution in selecting and using herbicides.

Crop Tree Release

Crop tree release is a specific type of release or an intermediate stand management strategy that singles out and releases trees with desired qualities, regardless of their spacing or location (Figure 1.4). This release requires the removal of undesired trees that are in direct competition with crop trees. Crop tree release applies a common practice of "crown touching release"—removing or killing all trees with crowns that interfere with crop trees. This management strategy is likely to result in an unequal distribution of crop trees throughout the stand.

With crop tree release, the landowner must inventory the property, determine the species considered to be crop trees, decide on the number of crop trees to be released per acre, and choose the specific trees to be cut. To help make these decisions, landowners will often use the "free-to-grow" rating, which determines the space needed for each crop tree to grow.



Figure 1.4. (A) Pre-commercial thinning in a sapling stand of longleaf pine. (B) Commercial thinning in an old pine stand. Image credits: (A) Bob Farni, USDA Forest Service, CC BY 3.0 US, [Flickr](#); (B) Dave Powell, USDA Forest Service, CC BY 3.0 US, [Flickr](#).

A manual for Forest Pest Management in the SE

Summary

Good forest stand management practices promote healthy crop trees that have enough open space to grow, contain few damaged or diseased trees, are easily accessible, and are well-protected against fires. Implementing sound forest pest management strategies to control common weed, insect, disease, and vertebrate pests described in this manual will optimize the wildlife habitat, aesthetics, recreation, or timber production capabilities of a well-managed forest.

Table 1.1. Summary of Timber Stand Improvement (TSI) Techniques

Method	Description/Benefit	Requirements
Release	Practice of selecting individual trees to remain in a stand until maturity, with removal of competing trees to allow seedlings to take hold.	Inject herbicides to selectively eliminate undesirable woody species within 2-5 years.
Crop Tree Release	Flexible technique that can be applied to even-aged or uneven aged stands to improve growing conditions through the removal of crown competition around selected trees. Differs from traditional thinning in that the crop tree can refer to the value of either the remaining trees or those removed, and can include ecological or economic benefit.	<ul style="list-style-type: none">• Determine space needed for each crop tree to grow using "tree to grow" rating for tree selection.• Released trees may be cut/felled and used for firewood and fence posts, girdled and left standing, or killed using a selective herbicide.
Pre-Commercial Thinning	In dense stands of immature trees, removal of trees to reduce competition and improve rate of growth for remaining trees. Can result in 10 to 20 percent gains in young pine stands.	<ul style="list-style-type: none">• Often delayed until culled trees are large enough to be used as firewood or fence posts to reduce waste.• Smaller trees removed by hand cutting, mechanical means, or herbicide applications.
Prescribed Burning	Use of fire under specific environmental conditions to achieve forest management goals that favor desirable trees. Promotes forest health and helps reduce environmental and human safety risks by reducing fuel for wildfires.	Performed under controlled conditions.

Review Questions for Chapter 1

1. _____ forest types mainly consist of broadleaved tree species that produce a fruit or nut and often go dormant during the winter.
 - A. Coniferous
 - B. Hardwood
 - C. Softwood
2. _____ forest types mainly consist of conifers or trees with needle-like leaves that produce seeds in cones.
 - A. Oak
 - B. Hardwood
 - C. Softwood
3. _____ contain trees of different ages, types, and composition and are often more resilient to pests and disease because of such diversity.
 - A. Natural forests
 - B. Managed forests
 - C. Nurseries
4. _____ typically consist of trees of similar age, species, and spacing. Because of this uniformity, they are prone to pest outbreaks, allowing insect pests and plant diseases to move quickly from one tree to the next.
 - A. Natural forests
 - B. Managed forests
 - C. Hardwood forests
5. Which timber stand improvement method requires the removal of non-crop trees in direct competition with desired trees?
 - A. Crop tree release
 - B. Pre-commercial thinning
 - C. Prescribed burning
6. _____ is the most appropriate herbicide application method for release in hardwood stands.
 - A. Foliar spray
 - B. Injection
 - C. Fumigation

Collaboration Teams – EPA/MSU meetings grant

New Features: We just launched a revision to the Home screen, formatting for Campfire and Ping messages, and a brand new way to [see who's working on something](#). Who's just [hanging out](#)?

Home **Lineup** **Pings** **Hey!** **Activity** **My Stuff** **Find**

[updates here](#), in this write-up on the Basecamp product blog. We hope you find them useful. And there's more coming soon! Until next time, thanks again for using Basecamp. -Jason Fried, Basecamp CEO



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Climate, IPM, Invasive Sp. Initiative

TEAM
Collaboration Leadership Team

TEAM
DelTO2020

TEAM
EPA Meetings Implementation Grant

TEAM
IPM-Pesticide Safety Education Coll...

HQ
NPSEC Admin Work
Staff meeting agendas and action items are part of this team

TEAM
Pacific Islands Collaboration Team
Includes Invasive Species Team

TEAM
Paraquat Collaboration Team

Pesticide Environmental Stewardship...

TEAM
Pollinator Collaboration Team

TEAM
Respirator Collaboration Team

TEAM
Wayne's Working Space

International IPM Symposium, March 2022



The IPM-Pesticide Safety Education Collaboration Team is a networking group composed of 36 people. Its mission is to identify and address educational needs and issues where IPM and Pesticide Safety education and outreach overlap.

The IPM PSE CT is supported by US EPA cooperative agreement **X8-83927401** with Michigan State University titled 'Engaging All Stakeholders' for pesticide applicator certification, the Worker Protection Standard and pesticide safety education. The Migrant Clinicians Network (MCN) and the National Pesticide Safety Education Center (NPSEC) are sub-contractors under Michigan State University for the cooperative agreement.

IPM Pesticide Environmental Stewardship Project Team (Basecamp)

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...

Pesticide Environmental Stewardship - IPM

[Add/remove people](#)

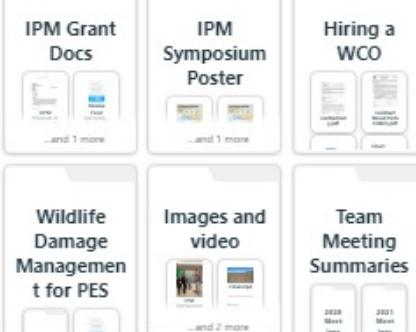
Message Board

- W April 4th meeting**
Hi, Team, This is your friendly reminder 4
- MH IR-4 Virtual Crop Tour Series Invitation: Hops**
- RH IPM/PSEP webinar from Cornell**
Pesticides: Part of the IPM Toolbox March
- W March 21 Meeting**
Hello everyone! I got so carried away 3
- W March 7th meeting**
Hi, Team, The 10th International IPM 1
- W Hello everyone,**

To-dos

Mailing Addresses

Docs & Files



Campfire



Joellen Lampman 1:16pm ***



Set important dates on a shared schedule. Subscribe to events in Google Cal, iCal, or



Automatic Check-ins

Create recurring questions so you don't have to pester your team about what's

Basecamp “Operations”

Home Lineup Pings Hey! Activity My Stuff Find

Pesticide Environmental Stewardship -...

+ New...

Docs & Files

Unsorted

...

IPM Grant Docs



...and 1 more

IPM Symposium Poster



...and 1 more

Hiring a WCO



From Gary Iash: Hiring a Professional

Wildlife Damage Management for PES



Notes: Dean and Wayne...

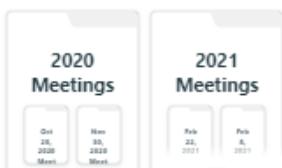
Images and video



Notes: zip baiting

...and 2 more

Team Meeting Summaries



...and 15 more



IPM for PES

PES_IPM_Using_Basecamp.docx

IPM_PES_Participants_Feb2021.xlsx

Notes:
Updated Ronda and
Kimberly's contact
information.