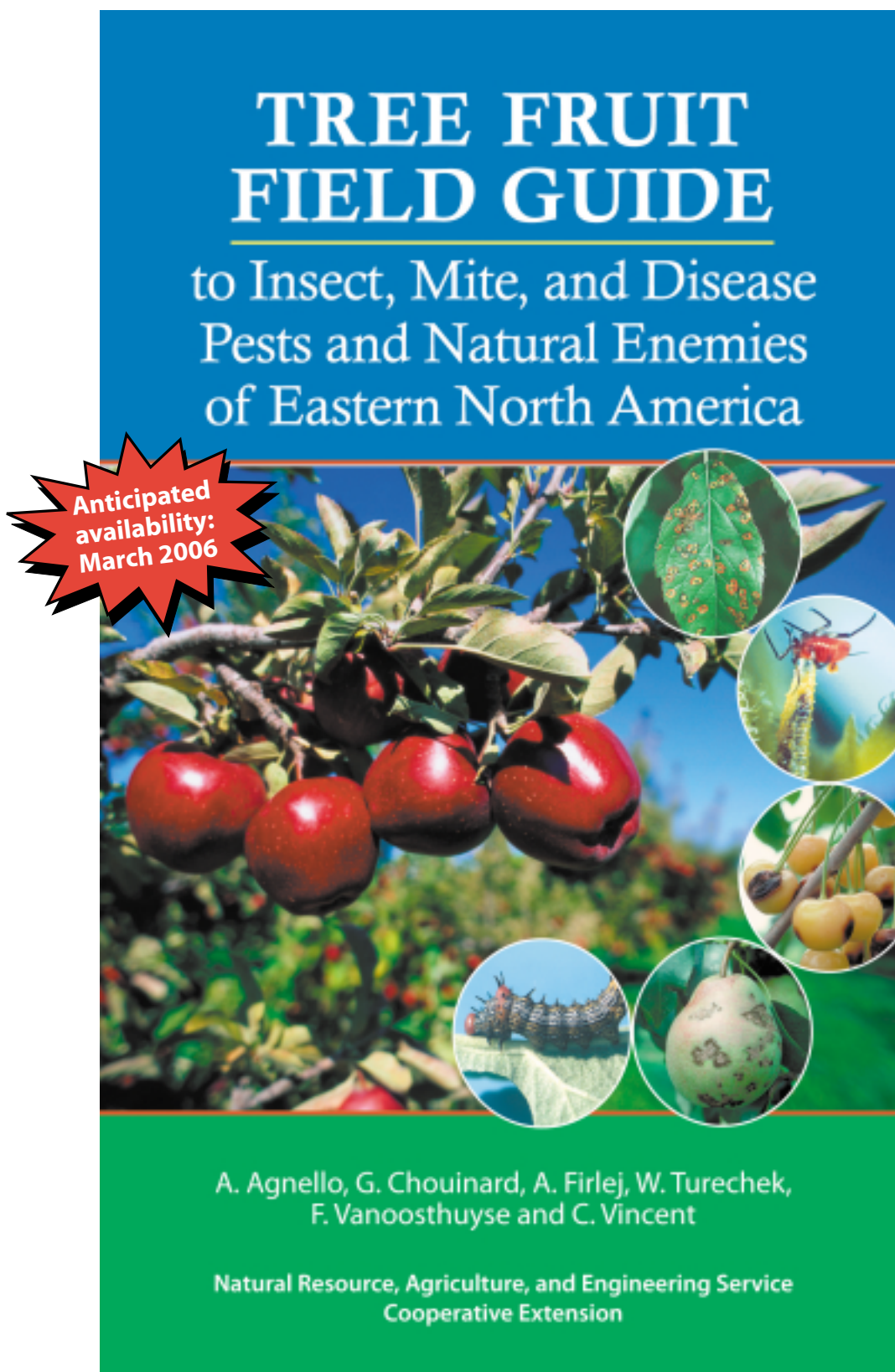


The deadline to sponsor or pre-order has been extended to **January 30, 2006**.
See inside for details, a list of current sponsors, and sample pages.



Actual book size (5 inches wide by 8.5 inches tall) shown above.

CURRENT SPONSORS

*Tree Fruit Field Guide to Insect, Mite, and Disease Pests
and Natural Enemies of Eastern North America*

Arysta LifeScience

BASF Agricultural Products

Bayer CropScience LP

Cerexagri, Inc.

Chemtura Crop Protection

Dupont Crop Protection

FMC Corporation

Spectrum Technologies, Inc.

Syngenta Crop Protection

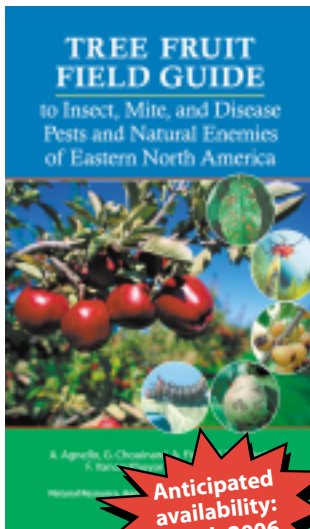
Valent USA

Financial support also provided by the Northeastern IPM Center.

Page ahead for sponsorship information and sample pages ►

Sponsorship and Pre-order Information — *Tree Fruit Field Guide*

The key to successful, economic pest control is accurately identifying pests and differentiating between pests and beneficials. The *Tree Fruit Field Guide to Insect, Mite, and Disease Pests and Natural Enemies of Eastern North America* was developed specifically for that purpose. It focuses on tree fruit production in the eastern United States and Canada and will interest growers, horticultural consultants, educators, scientists, gardeners, students—anyone interested in tree fruit.



Specifications and features include:

- Descriptions of 100+ species of insect/mite pests, 30+ types of beneficials, and 80+ diseases
- 450+ full-color photos for accurate identification
- Actual-size silhouettes of pests and beneficials
- Insect/mite and disease diagnostic keys
- Suggested management strategies for pests and diseases and tips for preserving beneficials
- 230+ pages (estimated)
- Compact size (5 inches wide by 8.5 inches tall)
- Spiral binding for ease of use

Sponsor This Guide and Show Your Support

To help keep the price of the guide reasonable, the authors and publisher are seeking tree fruit industry sponsors for the project. Partial funding was provided by the Northeastern IPM Center. The guide is being published by NRAES, the Natural Resource, Agriculture, and Engineering Service (see our web site, WWW.NRAES.ORG).

Sponsorship positions your company as a supporter of quality management tools for growers. NRAES books are highly regarded for their practicality, and many have won excellence awards. They are used in cooperative extension programs, as college textbooks, and as management guides for growers and consumers. They are distributed through universities, magazines, horticulture supply catalogs, and cooperative extension offices. The *Tree Fruit Field Guide* was peer-reviewed for technical accuracy and usefulness to the intended audience. It will be marketed throughout the United States

and Canada as the most up-to-date, comprehensive guide of its kind.

Sponsorship starts at \$2,000. Benefits of sponsorship include:

- Acknowledgment as a sponsor on the inside front cover of every book printed and a half-page (4-inch-wide by 3.5-inch-tall) full-color advertisement in the back of the book
- 10 copies of the *Tree Fruit Field Guide to Insect, Mite, and Disease Pests and Natural Enemies of Eastern North America*
- The opportunity to order more copies of the guide at the pre-order price (see details below)

Sponsorship payments and advertisements must be received by January 30, 2006, to be included in the book.

Pre-order This Guide and Save

If you are not interested in sponsorship, perhaps you would like to pre-order. Pre-orders increase the print run and allow us to offer you a one-time-only lower price. Here are the details:

- **Price.** The anticipated pre-order price is \$21 per copy or less. The final price will be set in February 2006 and will depend on the total number of pre-orders and sponsors. The pre-order price will not be available outside of this offer. The expected list price is \$38 or less.
- **Minimum order.** The minimum pre-order is 50 copies.
- **Schedule.** Pre-orders will be accepted until January 30, 2006. Payment is due February 30, 2006. We expect to ship books in March 2006. NRAES can be flexible with customers to meet their organizations' requirements for payment and delivery.
- **Shipping.** All orders must be shipped to a single address. The following S&H charges will be added to your order:

| | |
|--|-----------------|
| Order total is \$1,000.01–\$1,500.00 | S&H is \$85.00 |
| Order total is \$1,500.01–\$2,000.00 | S&H is \$115.00 |
| Order total is \$2,000.01–\$2,500.00 | S&H is \$145.00 |

**For every additional \$500 ordered, add another \$30 S&H.*

- **NY sales tax.** New York State orders will be charged 8% sales tax (calculated on both the cost of the books and S&H charges).

Note: Orders for less than 50 copies will be accepted when the book is in print. Contact NRAES if you'd like to receive an e-mail announcement or flier when the book is available.

For More Information about this offer, contact the NRAES office at (607) 255-7654 or <NRAES@CORNELL.EDU>. For more about NRAES, visit our web site, <WWW.NRAES.ORG>.

Return this form, sponsorship payment, and company advertisement by January 30, 2006. Payment for pre-ordered books is due February 30, 2006.

- Yes, we want to sponsor the *Tree Fruit Field Guide*. Our contribution is in the amount of \$_____. (Minimum is \$2,000; please complete payment information below. Payment and company ad must be received by January 30, 2006, to be included in the book.)
- Yes, I would like to pre-order _____ copies of the *Tree Fruit Field Guide*. (Minimum is 50 copies to receive the pre-order price. Commitment due by January 30, 2006. Payment due February 30, 2006. NRAES will contact you with your order total after the pre-order price is set.)

Name _____

Company/organization _____

Address _____

City, state/prov, zip/postal code _____

Phone _____ Fax _____

E-mail _____ Web site _____

Payment Information (For Sponsor Funds Only)

- My **check/money order**, made payable to NRAES in the amount of \$_____, is enclosed. (U.S. funds only. Returned checks incur an additional charge of \$25.)
- Please charge my **credit card** in the amount of \$_____. (Circle card type at right and complete the information.)



12-2005

CREDIT CARD NUMBER

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|

EXPIRATION DATE

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

Signature (required on credit card orders) _____

Actual book size (5 inches wide by 8.5 inches tall) shown below.

TREE FRUIT FIELD GUIDE

to Insect, Mite, and Disease
Pests and Natural Enemies
of Eastern North America

A. Agnello, G. Chouinard, A. Firlej, W. Turechek,
F. Vanoosthuysse & C. Vincent

Parts translated by N. Tanguay from the original French publication
by G. Chouinard, A. Firlej, F. Vanoosthuysse & C. Vincent, entitled
Guide d'identification des ravageurs du pommier et de leurs ennemis naturels
(IRDA-CRAAQ), 2000.

This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

Table of Contents

| | | | |
|---------------------------------------|----|--|----|
| Preface | 1 | Mineola moth | |
| Acknowledgments | 2 | (Destructive pruneworm) | 51 |
| How to Use This Guide | 7 | Apple pith moth | 52 |
| Insect and Mite Diagnostic Keys | 9 | Cigar/Pistol casebearers | 53 |
| Disease Diagnostic Keys | 15 | Eyespotted bud moth | 54 |
| | | Green fruitworms | 55 |
| | | Pale apple leafroller | 56 |
| | | 5. Leafrolling, shelters, defoliation, webbing | |
| | | Fruittree leafroller | 57 |
| | | Winter moth | 58 |
| | | Eastern/Forest tent caterpillars | 59 |
| | | Fall webworm | 60 |
| | | Gypsy moth | 61 |
| | | 6. Skeletonizing damage to leaves | |
| | | Pear slug (Pear sawfly) | 62 |
| | | Apple-and-thorn skeletonizer | 63 |
| | | Appleleaf/Birch skeletonizers | 63 |
| | | Spring cankerworm | 63 |
| | | Redhumped caterpillar | 64 |
| | | 7. Fruit stings, scars, bumps, spotting, russetting | |
| | | Apple red bug | 65 |
| | | Pear plant bug (Green apple bug) | 65 |
| | | Hawthorn dark bug | 65 |
| | | Mullein plant bug | 66 |
| | | Apple brown bug | 66 |
| | | Stink bugs | 67 |
| | | Tarnished plant bug | 68 |
| | | Western flower thrips/ Flower thrips | 69 |
| | | 8. Chewing/surface damage to fruit | |
| | | Japanese beetle/Rose chafer | 70 |
| | | Green June beetle | 71 |
| | | Lesser appleworm | 72 |
| | | Obliquebanded leafroller | 73 |
| | | Threelined (<i>Pandemis</i>) leafroller | 73 |
| | | Redbanded leafroller | 74 |

This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

| | | | |
|--|-----|--|-----|
| Tufted apple budmoth | 75 | Plum rust mite | |
| Sparganothis fruitworm | 76 | (Peach silver mite)..... | 109 |
| Variegated leafroller | 76 | Twospotted spider mite | 110 |
| 9. Internal fruit feeders | | Beneficial insects, spiders, and mites | |
| Apple curculio | 77 | Acari (Mites) | |
| Plum curculio | 77 | Phytoseiid mites | 111 |
| Apple maggot..... | 78 | Stigmaeid/Yellow mites | 112 |
| Cherry/Black cherry fruit flies | 79 | Other predatory mites | 113 |
| Dock sawfly | 80 | Araneida (Spiders) | |
| European apple sawfly | 81 | Jumping, Crab, and Sac spiders | 114 |
| Cherry fruitworm | 82 | Orb-weavers, Cobweb, Mesh- web and Sheet-web spiders..... | 114 |
| Codling moth | 83 | Coleoptera (Beetles) | |
| European corn borer | 84 | 2-spotted lady beetle | 115 |
| Oriental fruit moth | 85 | 7-spotted lady beetle | 115 |
| 10. Fruit deformation | | 14-spotted lady beetle | 115 |
| Pear midge | 86 | Multicolored Asian lady beetle (Halloween beetle) | 116 |
| Apple seed chalcid | 87 | Spider mite destroyer (<i>Stethorus punctum</i>) | 117 |
| 11. Bark/stem damage | | Diptera (Flies) | |
| Shothole borer | 88 | Gall midges | 118 |
| Peach bark beetle | 89 | Hover flies | 119 |
| Buffalo treehopper | 90 | Tachinid flies | 120 |
| Periodical cicada | 91 | Hemiptera: Heteroptera (True Bugs) | |
| Snowy tree cricket | 92 | Glassy-winged mirid bug | 121 |
| 12. Wood-boring damage | | Assassin bugs | 122 |
| American plum borer | 93 | Minute pirate bugs | 122 |
| Dogwood borer | 94 | Mullein plant bug | 122 |
| Lesser peachtree borer | 95 | Stink bugs | 122 |
| Peachtree borer | 96 | Hymenoptera (Bees and Wasps) | |
| Prionus borers | 97 | Bees and bumble bees | 123 |
| Roundheaded/ Flatheaded appletree borers | 98 | Ichneumonid wasps | 124 |
| 13. Scales | | Braconid and Chalcid wasps | 124 |
| European fruit lecanium (Brown apricot scale) | 99 | Neuroptera (Lacewings) | |
| European fruit scale | 100 | Green and brown lacewings | 125 |
| Forbes scale | 101 | Thysanoptera (Thrips) | |
| Oystershell scale | 102 | Black hunter | 126 |
| San Jose scale | 103 | | |
| White peach scale | 104 | | |
| 14. Mites | | | |
| Apple rust mite | 105 | | |
| European red mite | 106 | | |
| Pear rust mite | 107 | | |
| Pearleaf blister mite | 108 | | |

This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

| Diseases | |
|--|-----|
| 1. Trees wilted, stunted, off-color, or prematurely defoliating | |
| Apple union necrosis and decline (apple) | 000 |
| Armillaria root rot (all pome and stone fruit) | 000 |
| Constriction disease of 'Stanley' plum (plum) | 000 |
| Crown gall (all pome and stone fruit) | 000 |
| Peach tree short life (apricot, nectarine, peach, plum) | 000 |
| Phony peach disease (peach) | 000 |
| Phytophthora root, crown and collar rot (pome/stone fruit) | 000 |
| Prunus stem pitting virus (cherry, peach) | 000 |
| Replant disorder (all pome and stone fruit) | 000 |
| Root-lesion nematodes (apple, cherry, peach) | 000 |
| Silver leaf (all pome and stone fruit) | 000 |
| Southern blight (apple, stone fruit) | 000 |
| Verticillium wilt (apricot, cherry, nectarine, peach, plum) | 000 |
| 2. Cankers (may be associated with wilting of branches) | |
| Apple anthracnose (apple, pear) | |
| Bacterial canker (apricot, cherry, nectarine, peach, plum) | 000 |
| Black knot (cherry, plum) | |
| Black rot (see Black rot under #6) | |
| Blister canker of pear (see Black pox under #5) | 000 |
| Nectria canker (apple, pear) | 000 |
| Perennial canker (apple, pear) | 000 |
| Perennial canker (apricot, cherry, nectarine, peach, plum) | 000 |
| White rot (apple and pear) | 000 |
| 3. Symptoms on blossoms and/or wilting new shoots | |
| Bacterial blossom blast of pear (pear) | 000 |
| Blossom blast (see Bacterial canker under #2) | 000 |
| Blossom and twig blight (see Brown rot under #6) | 000 |
| Fire blight (apple, pear) | 000 |
| Fusicoccum canker (peach) | 000 |
| Nectria twig blight (apple, pear) | 000 |
| 4. Symptoms on leaves only | |
| Alternaria blotch (apple) | 000 |
| Apple latent viruses (apple) | 000 |
| Apple mosaic virus (apple) | 000 |
| Cherry leaf spot (cherry) | 00 |
| Frogeye leaf spot (see Black rot under #6) | 000 |
| Mycosphaerella leaf spot (pear) | 000 |
| Necrotic leaf blotch (apple) | 000 |
| Pear vein yellows (pear) | 000 |
| Prunus necrotic ring spot (cherry, peach, plum) | 000 |
| Sour cherry yellows (cherry, plum) | 000 |
| 5. Symptoms on leaves and possibly fruit | |
| Apple scab (apple) | 000 |
| Bacterial canker (apricot, cherry, nectarine, peach, plum) (see Bacterial canker under #2) | 000 |
| Bacterial spot (apricot, nectarine, peach, plum) | 000 |
| Black pox (apple) | 000 |
| Fabraea leaf spot (pear) | 000 |
| Frogeye leaf spot (see Black rot under #6) | 000 |
| Green ring mottle (cherry) | 000 |
| Peach leaf curl (nectarine, peach) | 000 |
| Pear leaf spot (see Fabraea leaf spot under #5) | 000 |
| Pear scab (pear) | 000 |
| Plum pockets (plum) | 000 |
| Plum pox virus (peach) | 000 |
| Powdery mildew (apple, pear) | 000 |
| Powdery mildew (cherry) | 000 |

This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

| | | | |
|--|-----|--|------|
| Powdery mildew (apricot, nectarine, peach, plum) | 000 | Green fruit rot (apricot, cherry, nectarine, peach, plum) | 000 |
| Rust diseases : | | Moldy core (apple) | 000 |
| a. Cedar apple rust (apple) | 000 | Peach scab (peach) | 000 |
| b. Quince rust (apple, pear) | 000 | Rusty spot (peach) | 000 |
| c. Hawthorn rust (apple, pear) | 000 | Sooty blotch (apple, pear) | 000 |
| X-disease (cherry, peach) | 000 | Stony pit (pear) | 000 |
| | | White rot (apple, pear) | 000 |
| 6. Symptoms on fruit only | | | |
| Alternaria fruit rot (apricot, cherry, peach) | 000 | 7. Symptoms on harvested or stored fruit | |
| Anthracnose (cherry, peach, plum) | 000 | Bitter pit (apple) | 000 |
| Bitter rot (apple, pear) | 000 | Blue mold (apple, pear) | 000 |
| Black rot (apple, pear) | 000 | Cork spot (pear [see Bitter pit under #7]) | 000 |
| Blister spot (apple) | 000 | Gray mold (apple, pear) | 000 |
| Blossom end rot (see Black rot under #6) | 000 | Mucor rot (apple, pear) | 0000 |
| Brooks fruit spot (apple) | 000 | Rhizopus rot (peach) | 000 |
| Brown rot (apricot, cherry, nectarine, peach, plum) | 000 | Glossary | 192 |
| Calyx end rot (apple) | 000 | Figure 1. General structure of an insect | 194 |
| Dry eye rot (apple) | 000 | Figure 2. Structure of an aphid | 194 |
| Flyspeck (apple, pear) | 000 | Index/Cross-Reference | 195 |
| | | For Further Information | 204 |

This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

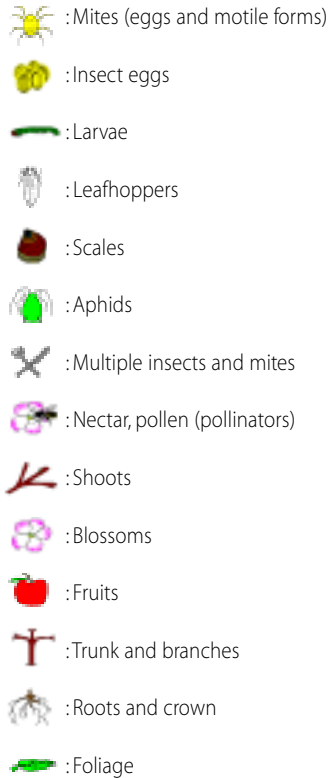
How to Use this Guide

This guide is a compilation of fact sheets separated into three sections, each covering a specific species or group of similar species. The first section offers material on arthropod pests (insects and mites). The second section describes beneficial insects and mites. The third section lists tree fruit diseases.

The arthropod information is presented as follows:

1. Taxonomic classification: Order (plus Suborder, for Hemiptera): Family
2. Common name
3. Scientific name and authority
4. Length (A: adult; in Lepidoptera, wing-span; L or N: last/largest larval or nymphal stage) in cm; refer to inside back cover for English units conversion scale
5. Principal period of activity in the crop (for indicated stages)
6. Feeding habits or site of attack
7. Number of generations per year
8. Photos of pertinent life stages and injury

The following icons represent the feeding habits of the species. They illustrate which prey or part of the fruit tree is preferentially consumed or attacked and which represents more than 90% of its total diet.



This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

Impact: Repetition of an icon, in both of the first two sections, indicates the importance (either in frequency or significance of economic impact) of each pest or predator:



Light –
minor pest or predator



Moderate –
secondary pest or predator



Important –
major pest or predator

In the first section, which deals with arthropod pests, the following information is given:

Description: Major traits used to identify the insect or mite; note that younger nymphs or larvae may not have well-developed characteristic markings. These traits are not always unique to a particular species, but are used to distinguish it from other species presented in this guide.

Distribution: General geographic range of occurrence (in eastern North America only, even if species is more widely distributed). Key: CT - Connecticut, FL - Florida, IL - Illinois, MA - Massachusetts, MD - Maryland, ME - Maine, MI - Michigan, NB - New Brunswick, NH - New Hampshire, NJ - New Jersey, NS - Nova Scotia, NY - New York, OH - Ohio, ON - Ontario, PA - Pennsylvania, QC - Québec, RI - Rhode Island, SC - South Carolina, VA - Virginia, VT - Vermont, WV - West Virginia.

Damage: Damage to the fruit or tree caused by the pest. In the interest of conserving space, life history details not directly related to species identification or pest activity on the crop (e.g., overwintering stage, mating or oviposition behavior, etc.) are not included in this guide.

Similar Species: Species of insects or mites that could be confused with the pest described.

Management: A synopsis of possible control management practices applicable and available when pest populations exceed tolerable levels. The reader is advised to consult local university or other expert guidelines for specific details on implementing these tactics.

The second section, which deals with beneficial species, includes the following information:

Status: Information on the beneficial activity of the predator or parasitoid with respect to its stages of development.

Distinctive Characteristics: Traits useful in recognizing the insect, spider or mite. These characteristics are not necessarily unique to a particular species, but are used to distinguish it from other species presented in this guide. When possible, other characteristics are indicated. They can be positive (☉) or negative (⊗), such as the sensitivity of the predator to pesticides.

Tree fruit diseases are addressed in the third section of this guide.

For each disease, a list of fruit hosts and main tissues attacked is indicated, followed by a description of the disease symptoms. Also provided is a description of the disease's geographical range, any similar diseases or disorders with which it can be confused, and a brief description of recommended management tactics.

IMPORTANT! This document is not intended as a protection guide. In order to determine whether pest populations represent a threat and justify intervention, the use of adequate and validated scouting methods is advised. For these scouting methods and details of preferred management options, please consult local university extension recommendations and the "For Further Information" section for general reference materials. If you have doubts about the identity of a species, or the risk it represents to the crop, consult a plant protection specialist.



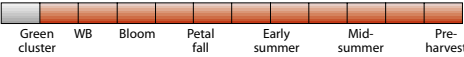

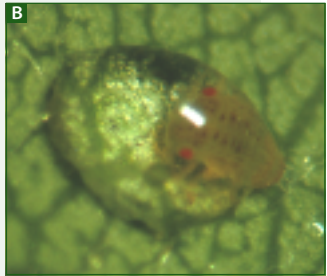


This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.



This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

| INSECT AND MITE PESTS | | Hemiptera: Sternorrhyncha: Psyllidae | | | | | | |
|--|--|---|--|--|--|--|----------|--|
|  <p>A: 2 mm N: 1.5 mm</p> | | <h2>Pear psylla</h2> <p><i>Cacopsylla pyricola</i> Foerster</p>  | | | | | | |
| | |  | | | | | | |
|  <p>NYSAES</p> | | <h3>Description</h3> <p>Adults (A) resemble very small cicadas and can be reddish brown (overwintered generation) or tan to light brown (summer forms). Smaller, wingless nymphs are yellow with red eyes, flat and oval in shape, and develop within a clear honeydew drop (B). Larger “hard shell” nymphs are darker, with black areas interspersed with green or brown coloration (C); these forms have noticeable wing pads and are free-living.</p> | | | | | | |
|  <p>NYSAES</p> | | <h3>Distribution</h3> <p>Widespread and a major pest in most fruit-growing states and provinces in eastern North America.</p> | | | | | | |
|  <p>NYSAES</p> | | <h3>Damage</h3> <p>Attacks pear exclusively. Motile stages are “flush feeders” that suck sap from newer, tender growth, and secrete excess fluid as honeydew. This collects on leaves and fruits, provides a good medium for sooty mold growth (D). Psylla feeding can kill leaf tissue (called “psylla scorch”) in sunny, dry conditions. Excessive feeding and injection of toxic saliva can cause wilting and premature leaf drop.</p> | | | | | | |
|  <p>NYSAES</p> | | <h3>Similar Species</h3> <p>The apple sucker (<i>Psylla mali</i>, p#) is closely related, but can be distinguished by its lighter coloration and the fact that it does not occur on pear.</p> | | | | | | |
| | | <h3>Management</h3> <p>Spring egg-laying can be suppressed by pre-bloom oil applications. Diligent hand removal of suckers can greatly reduce psylla populations. A balanced fertilizer program and avoidance of excessive nitrogen greatly reduces flush vegetative growth that attracts psylla. Many predacious insects are natural enemies, but commercial production often requires applications of broad-spectrum insecticides, highly refined summer oil, kaolin clay or insecticidal soap.</p> | | | | | | |
| | | <p>Leaf surface damage, discoloration, mottling, mold, honeydew</p> | | | | | <p>2</p> | |

This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.


INSECT AND MITE PESTS


Lepidoptera: Gracillariidae


Spotted tentiform leafminer
Phyllonorycter blancardella (Fabr.)

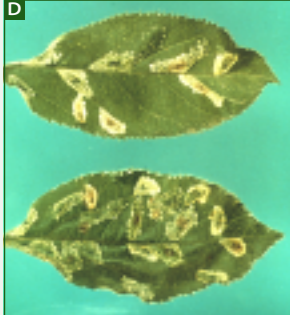
A: 4 mm L: 4 mm


Tight cluster Pink Bloom Petal fall Early summer Mid-summer Pre-harvest

A

NYSAES

B

NYSAES

C

NYSAES

D

NYSAES

E

Alan Eaton

Description
The adult is a tiny beige moth with heavily fringed wings striped with golden brown and white bands (A). Eggs are laid individually on the undersurface of the leaves. The yellowish larva has a dark head and lives inside the leaf (B).

Distribution
Widespread in most fruit-growing states and provinces in eastern North America.

Damage
Apple is the preferred host. The first three larval instars feed on the tissues between the two epidermal layers of the leaf, separating the outer layer of the leaf undersurface from the tissue above and causing a translucent sap-feeding mine that is visible only from the under leaf surface (C). The last two instars feed more extensively on leaf tissues and their tissue-feeding mines appear as clear blotchy swellings (D) on the upper surface of the leaf and gray on the underside with a longitudinal pinch.

Similar Species
The apple blotch leafminer (*P. crataegella* Clemens), is nearly indistinguishable from the spotted tentiform leafminer, but has forewings that are usually smaller and less heavily marked with white scales (E). *P. crataegella* is more prevalent in New England than elsewhere, and its hosts include apple, pear, cherry, plum and quince.


Management
Monitor the population with pheromone traps and use a degree-day developmental model to fix the period of 2nd generation mine occurrence; insecticide applications normally not necessary unless mines exceed 1–2 per leaf (check local threshold recommendations). Spur and leaf sampling for sap-feeding mines allows effective timing of spray applications. Selective insecticides allow parasitoids to substantially reduce larval populations.

Leafminers

3





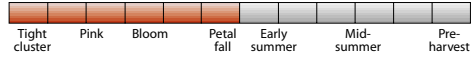



This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

| INSECT AND MITE PESTS | | Lepidoptera: Pyralidae |
|---|--|---|
|  | Mineola moth (Destructive pruneworm) <i>Acrobasis tricolorella</i> (Grote) |  |
| A: 9–12 mm (length) | L: 13 mm |  |
|  NYSAES | Description Adult is a bluish gray moth that assumes a wedge shape when at rest. It has a transverse broad white stripe bordered by a smaller reddish brown stripe in the middle of the forewings; a smaller set of similar bands occur near the posterior edge (A). The larva has a brown head, with a body that is dark grayish brown dorsally and reddish brown ventrally, and marked with many short spines (B). | |
|  NYSAES | Distribution Southern Canada and south to ME and MI. | |
|  NYSAES | Damage Attacks cherry mainly, also plum, and may be found in apple. Overwintered larvae feed on and consume fruit buds (C) and developing flower parts, later forming nests in leaf terminals from which they continue to feed. Early summer larvae attack the fruits (D) and feed around the pits as they near harvest. | |
|  NYSAES | Similar Species Adult and larval forms resemble American plum borer (<i>Euzophera semifuneralis</i> , p#), which is closely related. May be distinguished by the fact that it does not bore into cambial tissue. | |
| | Management Rare in occurrence, so intervention is seldom needed. Chemical controls can be applied against overwintered larvae in the spring between green tip and white bud, and against emerging moths in late June. | |
| Chewing damage to buds, blossoms, leaves | | 4 |

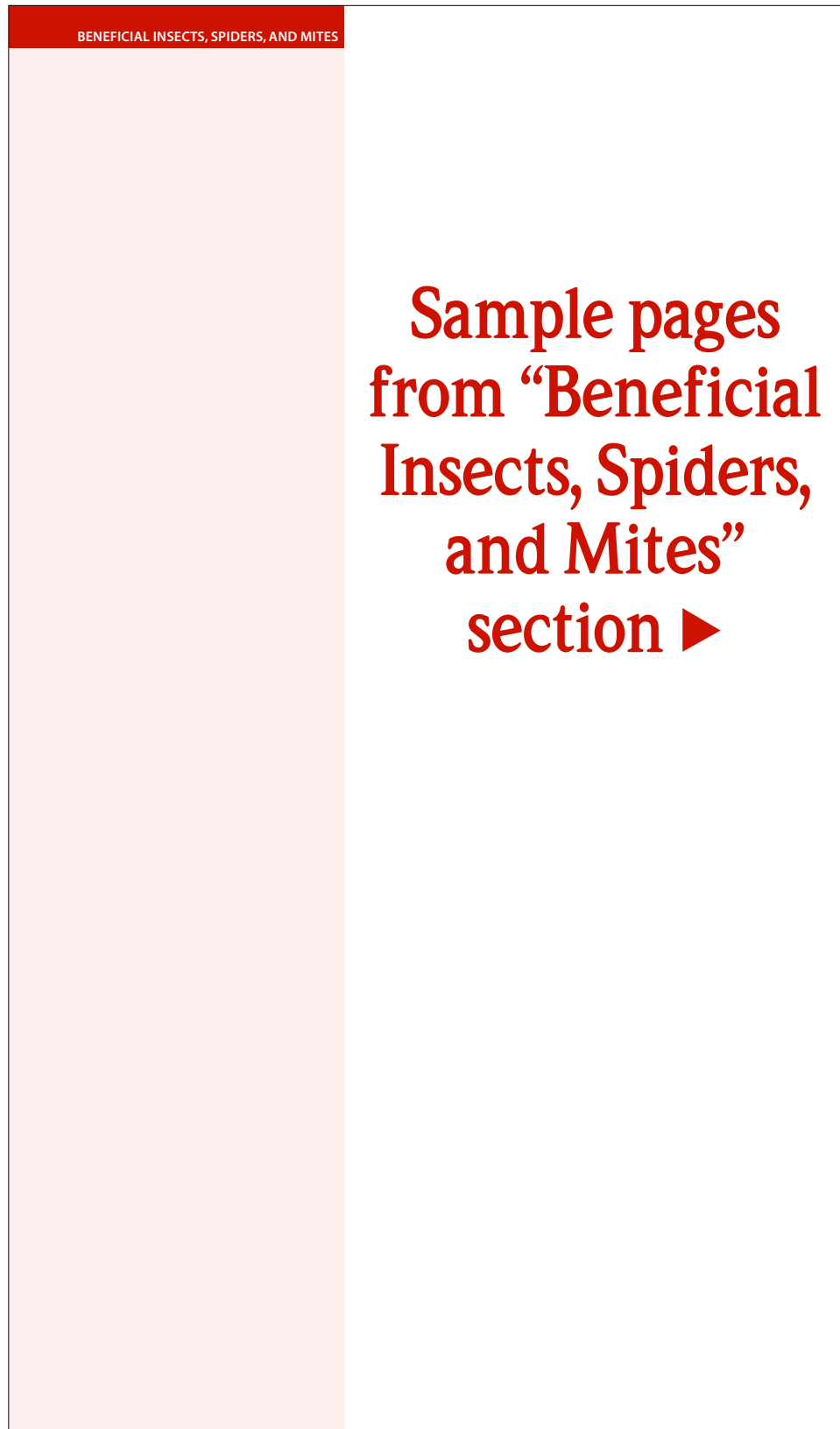
This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

| INSECT AND MITE PESTS | | Lepidoptera: Geometridae | |
|---|--|---|--|
|  (F) |  L: 25–30 mm | <h2>Winter moth</h2> <p><i>Operophtera brumata</i> (L.)</p>  | |
|  (M) | A: 25 mm |  | |
|  Opie/Remi Coutin | | <h3>Description</h3> <p>Adult male has grayish brown wings; the female has vestigial wings and cannot fly. This, in combination with the female's large body, makes the legs appear to be long, and gives her the superficial appearance of a spider (A). Early larva is olive-green with a black head; later forms are a brighter green, with white stripes along the back and sides (B).</p> | |
|  Opie/Remi Coutin | | <h3>Distribution</h3> <p>Mainly maritime provinces of eastern Canada, but also coastal MA and RI.</p> | |
|  Erica Bent | | <h3>Damage</h3> <p>Attacks apple mainly, but also may be found on pear, cherry and plum. Larvae feed on early foliage, loosely spinning leaves together and eating holes in them; later they may eat flower buds and bite holes in developing fruitlets. Damaged sites heal and appear at harvest as a flat or concave area with a corky surface, or sometimes as a deep cleft if the feeding was deep (C).</p> | |
| | | <h3>Similar Species</h3> <p>Resembles the green pug (<i>Chloroclystis rectangulata</i>, p#), particularly in the first 2 instars, but may be distinguished by distribution and larval coloration (several white stripes in later instars, as opposed to a single reddish dorsal stripe in the green pug).</p> | |
| | | <h3>Management</h3> <p>If needed, insecticide applications may be directed against the young caterpillars soon after hatch, normally from the tight cluster to pink bud stages.</p> | |
| Leafrolling, shelters, defoliation, webbing | | 5 | |

This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.




This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

BENEFICIAL INSECTS, SPIDERS, AND MITES Acari: Phytoseiidae


Phytoseiid mites


Amblyseius (= *Neoseiulus*) *fallacis* (Garman)
Typhlodromus pyri (Scheuten),
T. caudaglans Schuster
T. longipilus Nesbitt, *T. vulgaris* Ehara

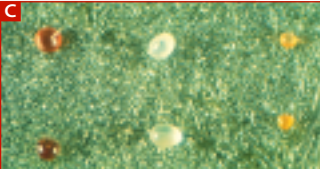


A: 0.33 mm

| | | | | | | |
|---------------|------|-------|------------|--------------|------------|-------------|
| Tight cluster | Pink | Bloom | Petal fall | Early summer | Mid-summer | Pre-harvest |
|---------------|------|-------|------------|--------------|------------|-------------|

A 
NYSAES

B 
NYSAES

C 
NYSAES

Description

Adults have a translucent teardrop-shape body (A). A dark mark in the form of an “H” sometimes appears within their body. This mark is red when they feed on European red mites and yellow when they feed on twospotted spider mites. They move very rapidly on the leaves. Nymphs are similar in appearance, and pale colored (B). Eggs are elliptical and clear white ((C), center).

⊗ These predators are very sensitive to pyrethroid and carbamate insecticides. However, observations suggest that certain populations may develop resistance.

Status


Along with stigmatid mites (p#), the phytoseiids are the most abundant predatory mites in apple orchards in this region. They appear in tree canopy mostly during the latter half of the season. *Amblyseius fallacis* tends to be more noticeable in the tree later as the summer progresses because of prey availability, but is present in the orchard ground cover season long. A number of different *Typhlodromus* species may be present in eastern fruit orchards; they cannot be differentiated without a microscope. Established populations of phytoseiids are capable of effecting seasonal biological control of phytophagous mites if not disrupted by the use of non-selective pesticides.

Acari (Mites) 116


This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

BENEFICIAL INSECTS, SPIDERS, AND MITES Acari: Stigmaeidae

 10 X
A: 0.33 mm

Stigmaeid/“Yellow” mites

Agistemus fleschneri (Summers) 
Zetzellia mali (Ewing)

Tight cluster Pink Bloom Petal fall Early summer Mid-summer Pre-harvest

Description and Distribution


Agistemus fleschneri is the principal species found in QC and northern ON orchards, while *Zetzellia mali* predominates in the US, southern ON and the maritime provinces. Immature stages are bright yellow. Adult females of *Agistemus* are orange-red (A) and can be confused with the European red mite (*Panonychus ulmi*), but do not possess its silky white hairs (p#). *Zetzellia* adults are bright yellow (B), but can appear reddish after feeding on red mites (C). Eggs are round and yellow ((D), right).

⊗ In general, these mites are sensitive to broad-spectrum insecticides, but less so than phytoseiid mites.


Status

Along with phytoseiids (p#), stigmaeid mites are the most abundant predatory mites in apple orchards in this region; they feed on the eggs and larval forms of apple rust mite and European red mite, among others. Not to be confused with the yellow spider mite, *Eotetranychus carpini borealis* (Ewing), which is a pest of brambles but can occur on tree fruit.

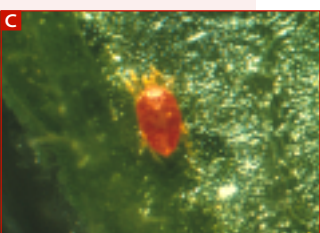
⊙ In combination with either the phytoseiid mites or other mite predators, these species contribute to the maintenance of pest mite populations below economic levels.



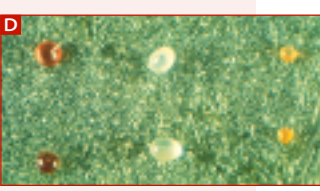
Gus Howitt



NYSAES



NYSAES

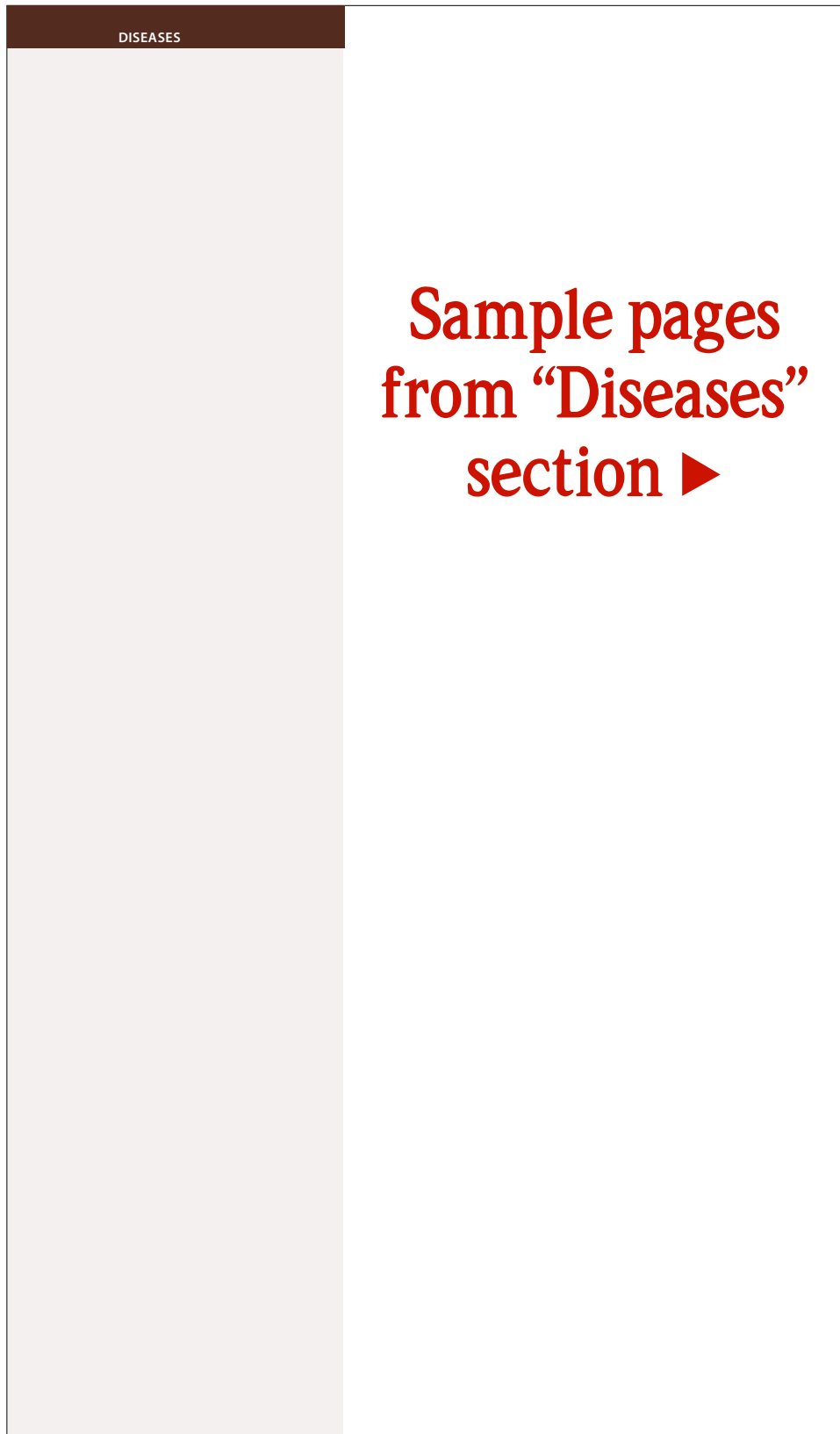


NYSAES

Acari (Mites) 117

This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.





This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

DISEASES


Armillaria root rot

Armillaria mellea (Vahl:Fr.) P. Kumm. 




A

Tom Burr



B

Tom Burr



C

Alan Jones

Host
Apple, Apricot, Cherry, Nectarine, Peach, Pear, Plum

Symptoms
The bark at the crown and roots sloughs off easily, exposing the dense white growth of the fungus (**A**). The growth extends in a fan-like pattern underneath the bark. Black shoestring-like strands (rhizomorphs) may be obvious on the surface of the bark (**B**). In the fall, yellow/brown mushrooms may appear at the base of the tree, especially if killed trees are left in place (**C**). Trees in affected orchards will often die in a circular pattern from one or more foci in the orchard.

Distribution
Occurs in all fruit-growing regions in eastern North America, but uncommon.

Similar Diseases and Disorders
Any disease or disorder affecting the root system or rootstock/scion union can produce similar above-ground symptoms. The presence of rhizomorphs distinguishes this disease from similar disorders.

Management
There are no practical control options. Stone fruit tend to be more susceptible to infection than apple and pear; however, susceptibility varies with the choice of rootstock. Of the stone fruit rootstock, Lovell, Mahaleb, Myrobalan, and NemaGuard are considered most susceptible, whereas Marianna and Mazzard are considered moderately resistant.

Trees wilted, stunted, off-color, or prematurely defoliating

156

This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

Silver leaf

Chondostereum purpureum (Pers.:Fr.) Pouzar



Tom Burr



William Turechek

Host

Apple, Apricot, Cherry, Nectarine, Peach, Pear, Plum

Symptoms

Silvering of the foliage is the characteristic symptom (A). At first, silvering may be associated with only one or two major branches, but eventually the entire tree becomes silvery in appearance. When infection is severe the leaves may curl upward. On apple, symptoms are usually evident shortly after petal fall. The symptoms progress over several seasons and trees slowly decline before dying. In some instances, affected limbs may recover and produce no symptoms in following years. The heartwood of affected trees is typically stained brown. In autumn, the fruiting bodies of the fungus (basidiocarps) appear on the surface of dead or severely infected limbs or the trunk (B).

Distribution

Widespread; the fungus affects many hosts.

Similar Diseases and Disorders

The silvering of the foliage is a unique symptom of this disease.

Management

Pruning cuts are susceptible to infection from spores released from basidiocarps during periods of rainy weather. The wounds are susceptible for about a week. Trees under stress are prone to attack; therefore, adequate drainage and fertilization help to reduce the incidence of disease. Infected trees should be rogued prior to the production of basidiocarps to reduce inoculum pressure. There are no practical chemical control measures to prevent infection.


This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.

Actual book size (5 inches wide by 8.5 inches tall) shown below.

DISEASES

Southern blight

Sclerotium rolfsii Sacc.



Host

Apple, Apricot, Cherry, Nectarine, Peach, Plum

Symptoms

Trees attacked by the fungus show a general decline (A). In the early phase of disease, a dense mat or web of white mycelium is evident at the base of the tree (B). The mycelium eventually disappears and leaves behind masses of hardened, fungal bodies called sclerotia (C). The sclerotia are globular, vary in size from 0.5–2.0 mm in diameter, and are at first white in color and turn tan to reddish or dark brown as they age.

Distribution


Mostly a problem from the Carolinas southward.

Similar Diseases and Disorders

Any disease or disorder affecting the root system or rootstock/scion union can produce similar above-ground symptoms. The presence of mycelium or sclerotia at the base of the tree can be used to distinguish this disease from similar disorders.


Management

The fungus is a natural and resilient inhabitant of many soils in the south. It is best to avoid establishing orchards in locations that have a history of the disease. Young trees are most susceptible to attack.




A

Turner Sutton



B

Turner Sutton



C

Turner Sutton

Trees wilted, stunted, off-color, or prematurely defoliating

158

This excerpt is an unedited draft and for promotional purposes only. For more information about becoming a book sponsor or pre-ordering copies of the finished book, contact the NRAES office by phone at (607) 255-7654 or by e-mail at <NRAES@CORNELL.EDU>.