Arthropods that damage hazelnuts:

Filbertworms, acorn weevils, stink bugs, and big bud mites

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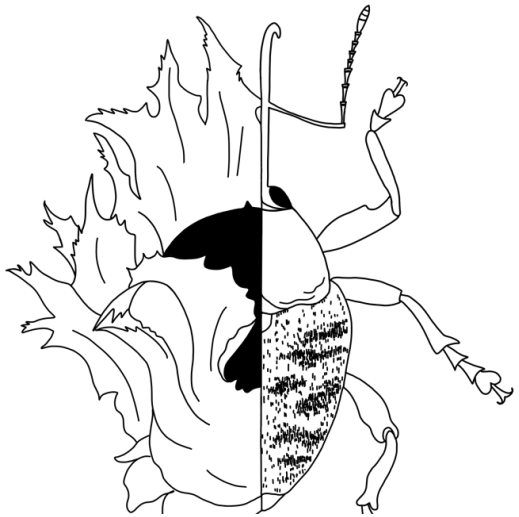
Forest Insect Ecology Laboratory
University of Minnesota



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@BugsNTrees

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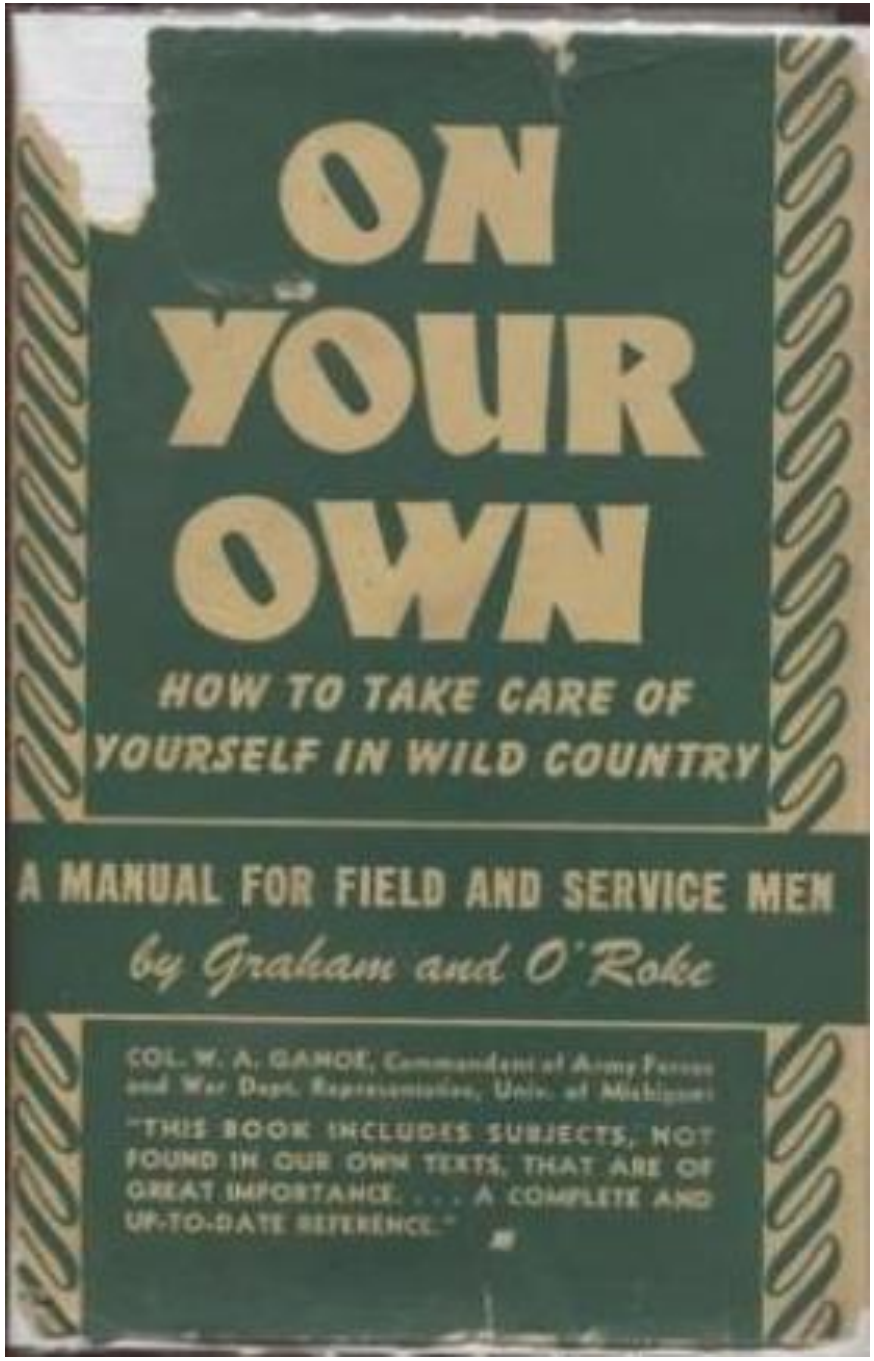
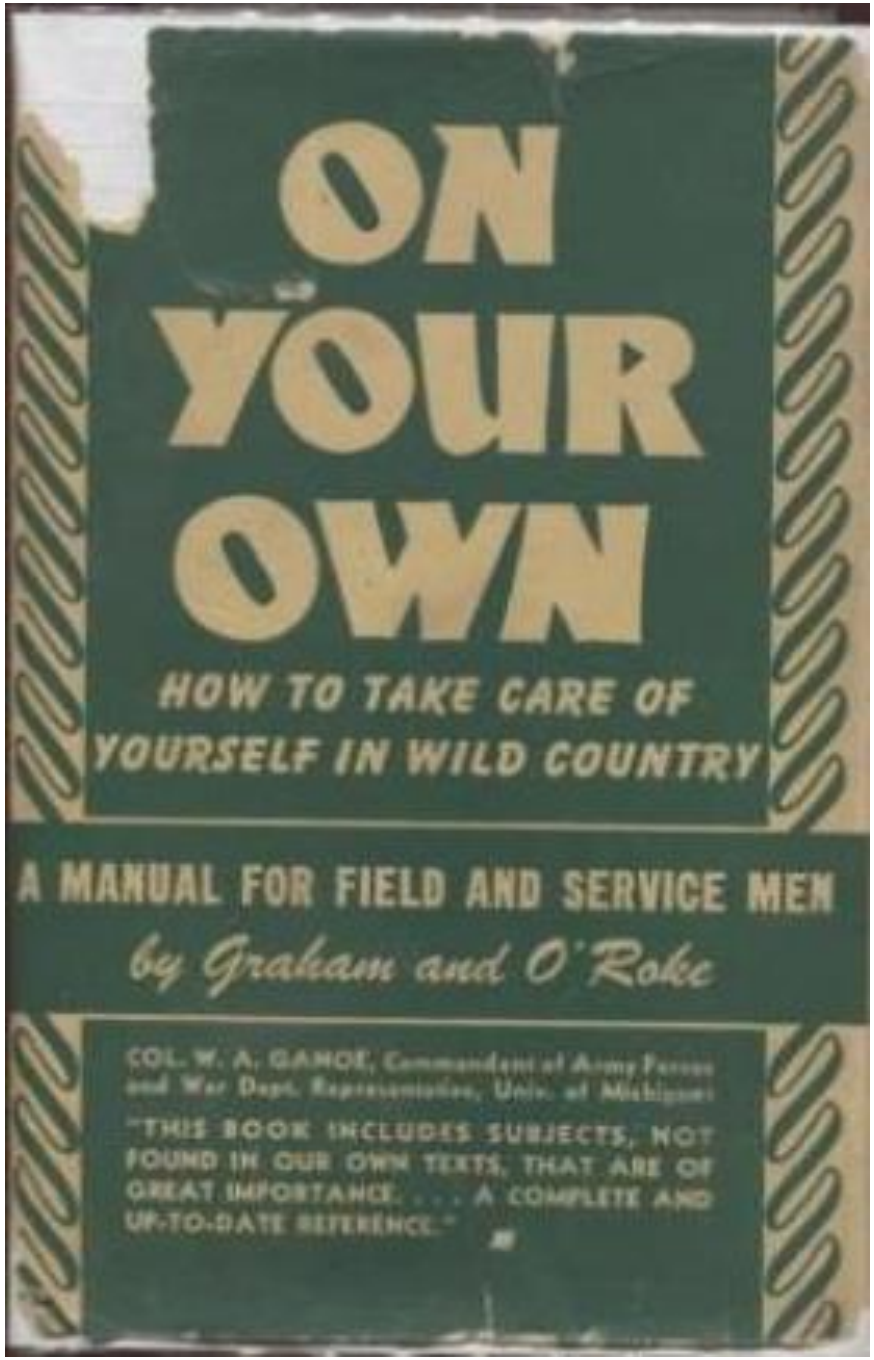
University of Minnesota


ON YOUR OWN
HOW TO TAKE CARE OF YOURSELF IN WILD COUNTRY
A MANUAL FOR FIELD AND SERVICE MEN
by Graham and O'Roke
COL. W. A. GANOE, Commandant of Army Forces and War Dept. Representative, Univ. of Michigan:
"THIS BOOK INCLUDES SUBJECTS, NOT FOUND IN OUR OWN TEXTS, THAT ARE OF GREAT IMPORTANCE. . . . A COMPLETE AND UP-TO-DATE REFERENCE."



As the authors remark, this booklet is not directed to the more experienced woodsman. Both Graham and O'Roke have had first hand experience in a great variety of conditions in this country; the discussion of insect pests and repellants seems especially useful. So does the advice with regard to natural food supplies.

-Karl P. Schmidt (Dec 31, 1943)

Hailey Shanovich

PhD Candidate
University of Minnesota

Part I

Arthropod Pests of Hazelnuts

Filbertworm moths

Filbertworm moth

Cydia latiferreana

Image credits: Agricultural Experiment Station OSU, Corvallis; Jim Burns


TRÉCÉ
INCORPORATED
Pheracon® II Trap

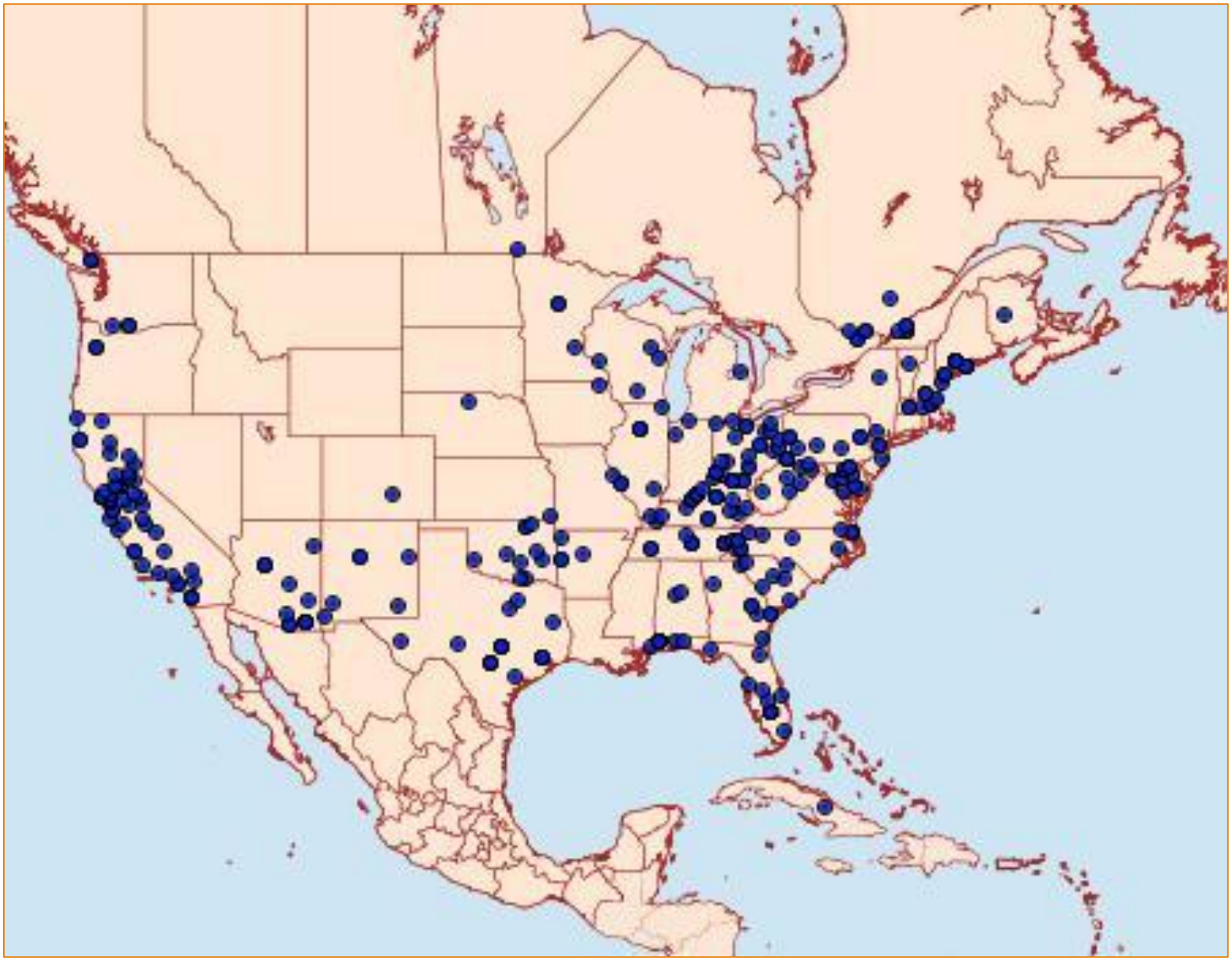


Image credit: NA Moth Photography Group/MS State University

Acorn weevils


Curculio glandium
Photo credit: Barry Webb


Acorn weevil, larva
Photo: Steven Katovich (USFS)

Species of native acorn nut weevils vary geographically

Oregon: Filbert nut weevil, *Curculio uniformis*

Midwest: Filbert nut weevil, *Curculio uniformis*

\+ ????

Image credit: Ryan Kaldari

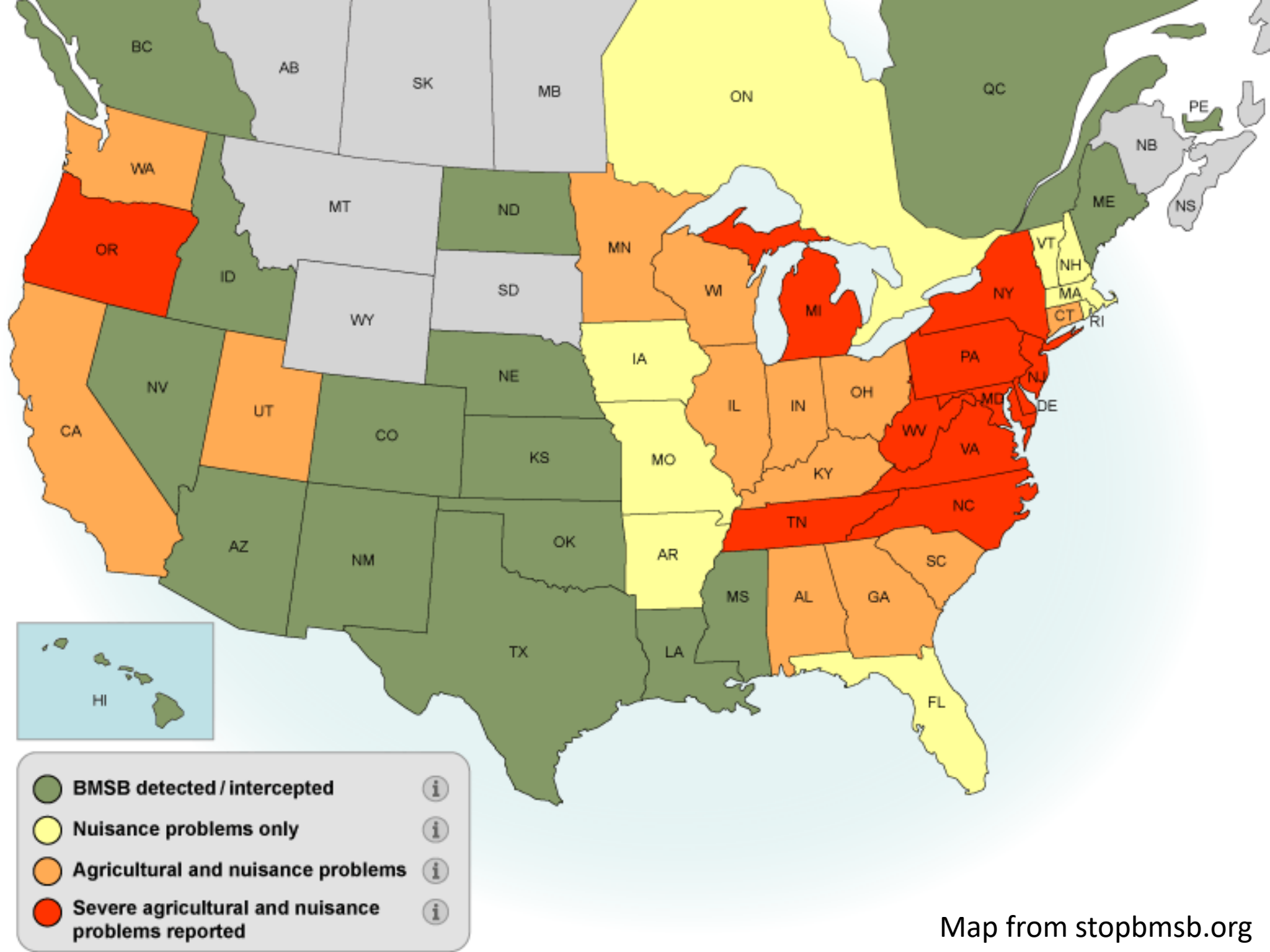
Brown marmorated stink bug

NATIONAL GEOGRAPHIC

ENVIRONMENT

Invasion of the stink bugs: how a tiny insect roils global communities

A hazelnut-producing region of far-western Georgia is caught up in the global fight to save crops and livelihoods from devastating stink bugs.



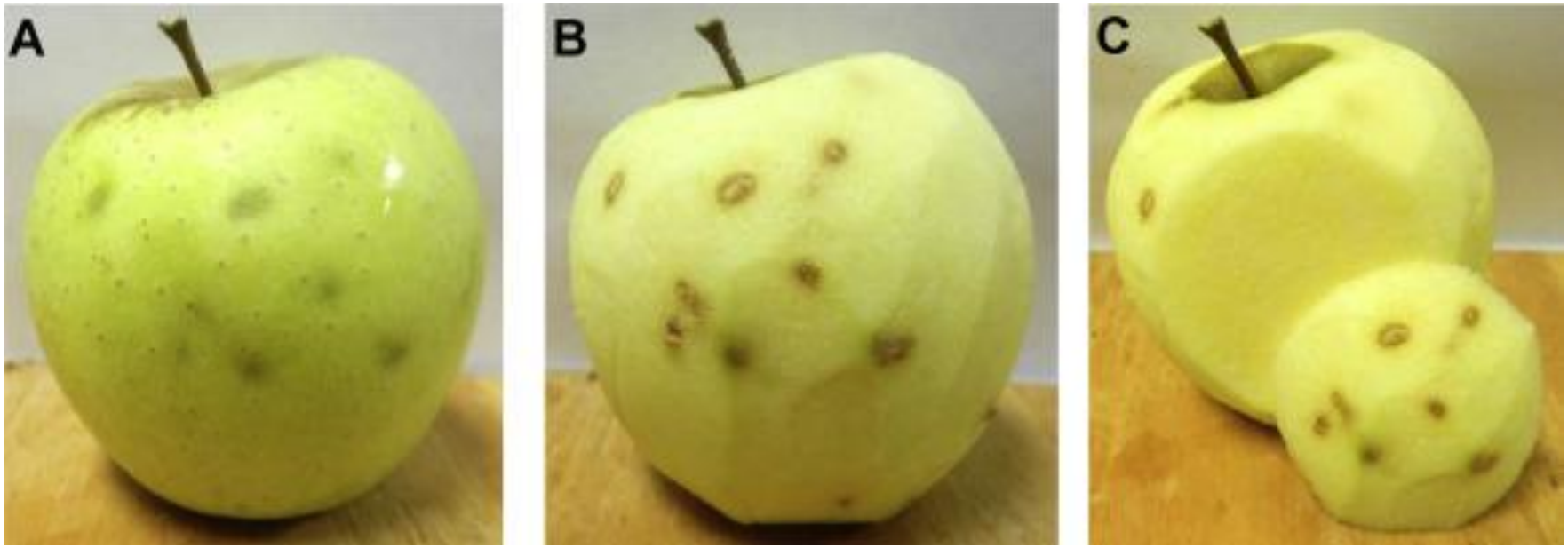
Map from stopbmsb.org


© Wil Hershberger

Growth stages of brown marmorated stink bug

stopbmsb.org

Feeding damage by brown marmorated stink bug on pink lady apple



Acebes-Dora, Lesky, Bergh (2016) *Crop Protection* 89: 58-65

BMSB feeding on mature hazelnut

Photo: Oregon Department of Agriculture

Feeding damage by brown marmorated stink bugs on developing hazelnuts

Hedstrom, Shearer, Miller, Walton (2014) *J Economic Entomology* 107: 1858-1865

BMSB looks like a lot of other stink bugs…but can be distinguished by:

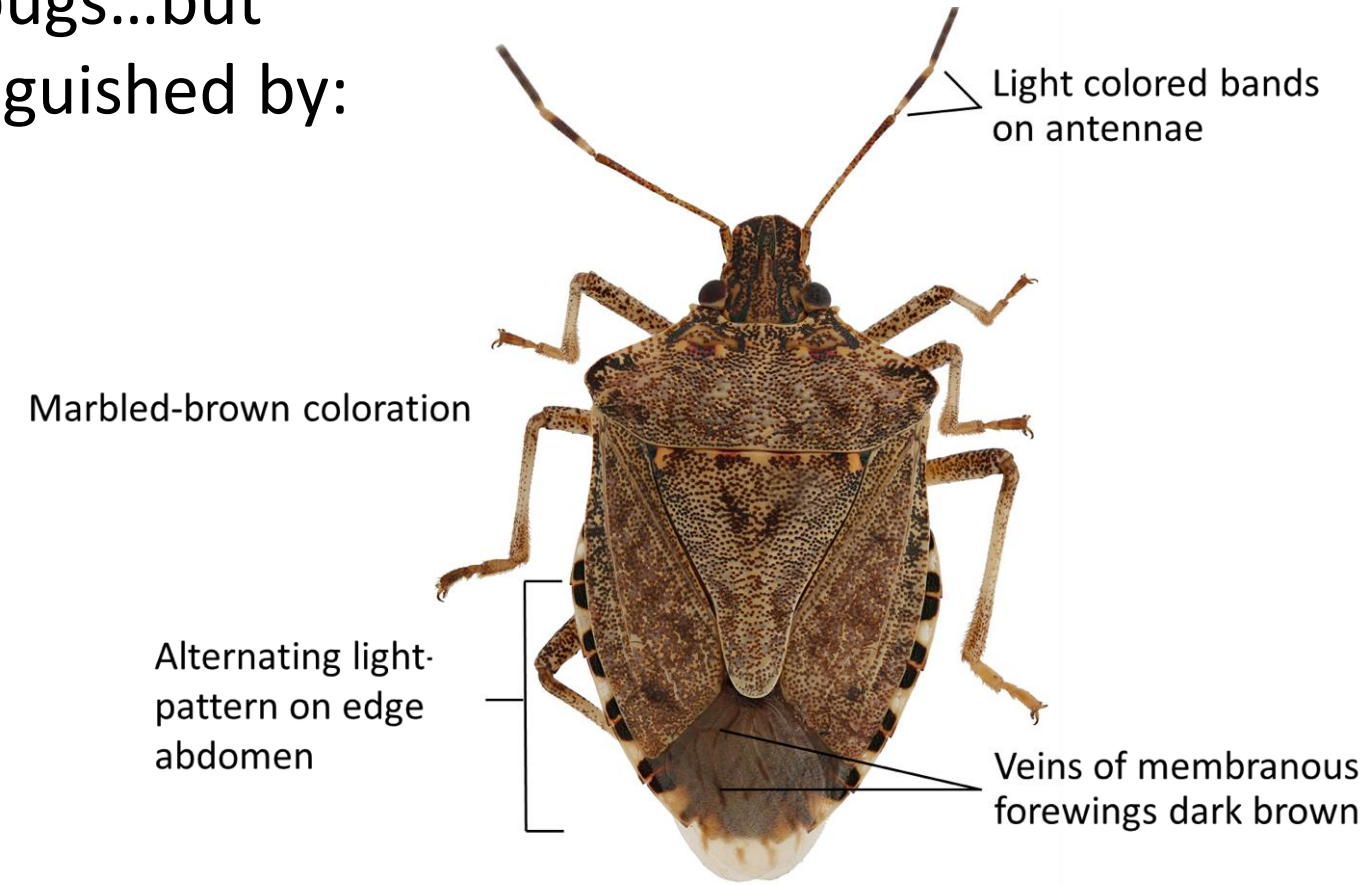


Photo: Theresa Cira

Download the app!

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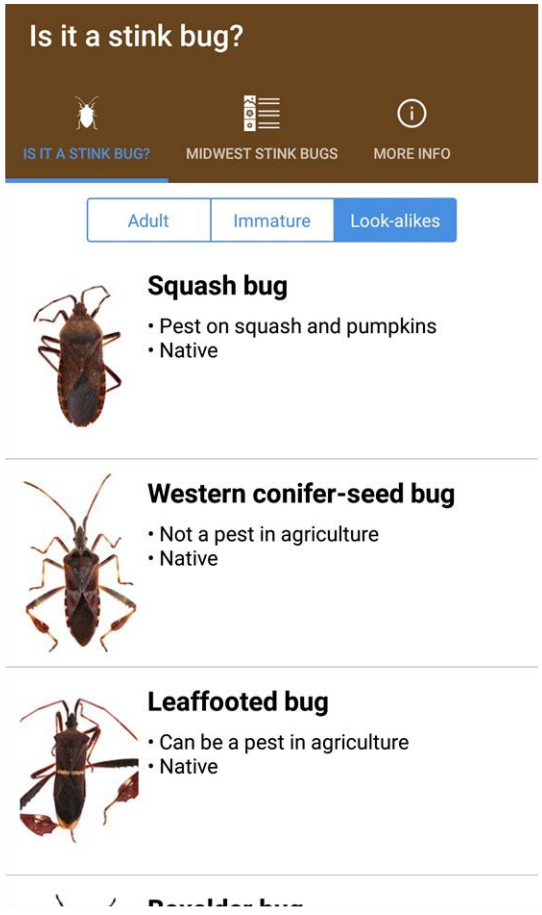


Photo: Northwest IPM Center

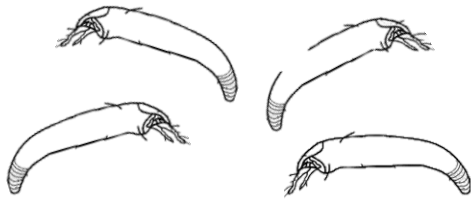

Bud mites

Two introduced species of big bud mites (BBM) damage hazelnuts in U.S.

- *Phytoptus avellanae and Cecidophyopsis vermiformis* are both problematic, introduced species from Europe in Oregon
- *Phytoptus avellanae* has been confirmed in WI plantings (Ariadna Chediack)
- Infest both floral and vegetative buds, directly affecting yield

Image credits: 1) USDA, WSU Eriophyid Mites; 2) Vaughn Walton, OSU, 3) OSU Extension

Big bud mite life cycle



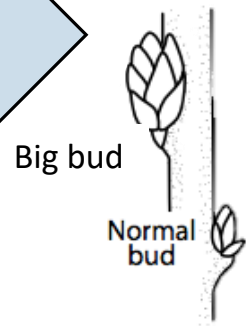
Both species migrate to new axillary buds

Feeding and reproduction inside buds

Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec | Jan | Feb

P. avellanae Big Buds

C. vermiformis Big Buds



Images taken from OSU handbook: Growing Hazelnuts in the Pacific Northwest Integrated Pest Management

Part II

Research Plans

Filbertworm moths

Research plans for filbertworm moths

- Monitoring

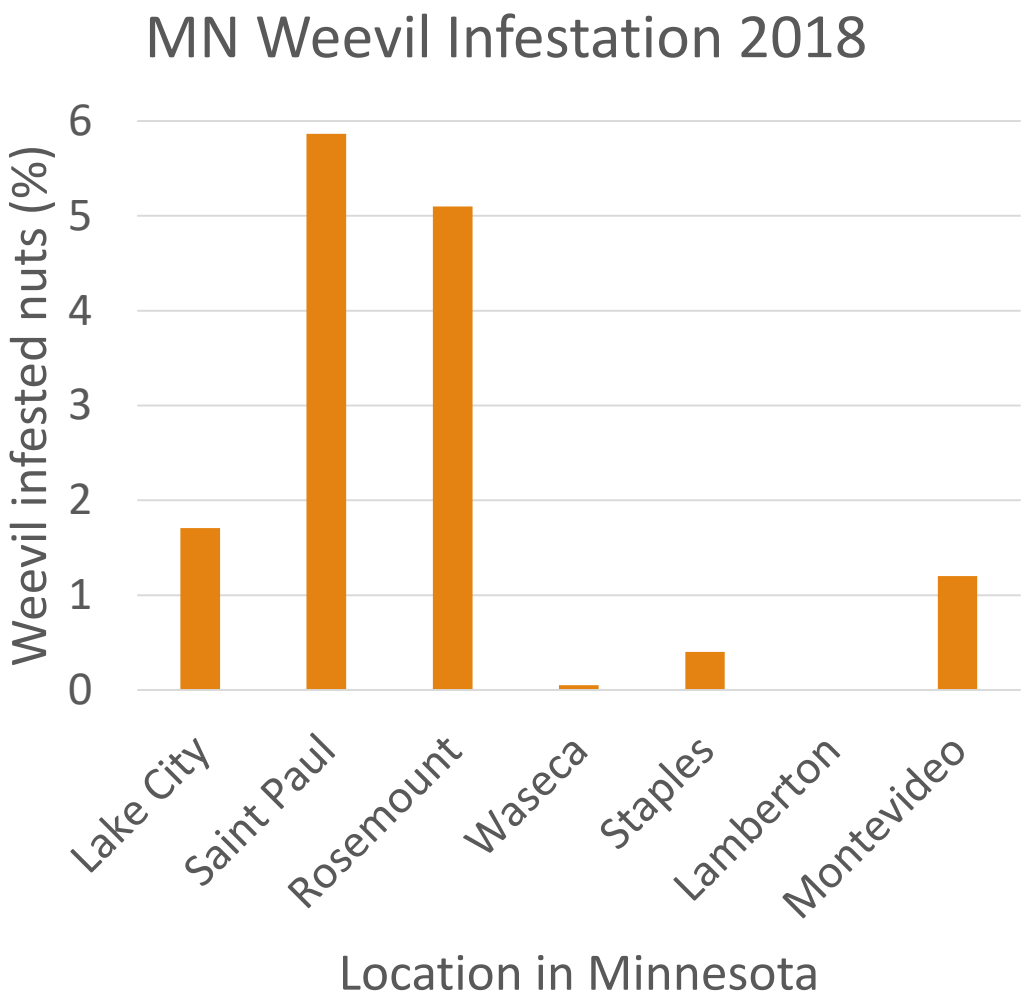
Acorn weevils

Weevil damage has been consistently found in some MN and WI plantings

We will examine:

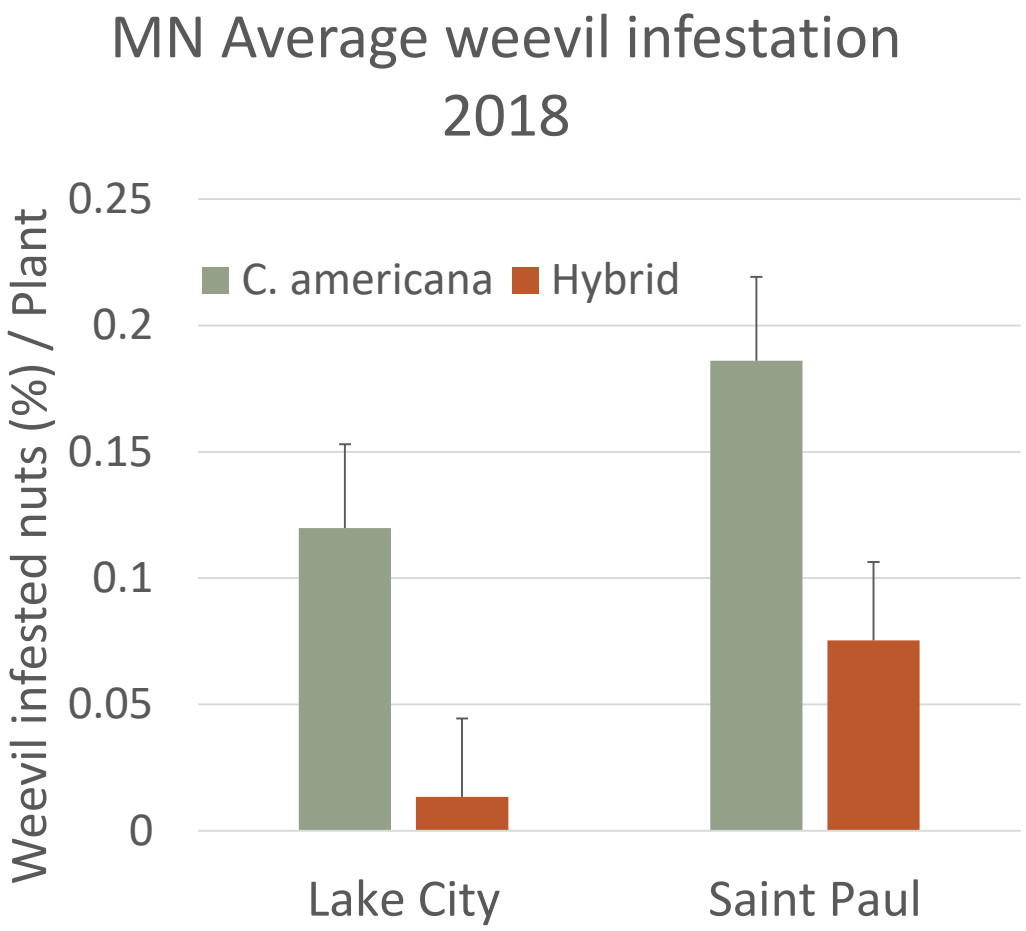
1. Species and life cycles of weevils
2. Timing of egg-laying or infestation in plantings
3. Trait preferences (e.g., might they prefer nuts with thinner shells?) (Jason Fischbach and Ariadna Chediack)

Image: Upper Midwest Hazelnut Development Initiative



Weevil damage varies greatly by location

Data collected by Lois Braun, UMN



We see higher infestation in *C. americana* plants than hybrids

Data collected by Lois Braun, UMN

Brown marmorated stink bug

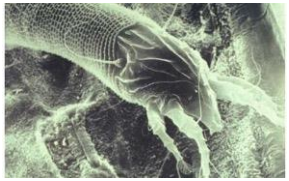
Currently it is unknown if BMSB will injure C. americana or hybrid hazelnuts

- We will examine potential preferences for shell thickness and other traits


Photo credit: Oregon Department of Agriculture


Bud mites

BBM are very difficult to control



- Chemical sprays only effective when mites are migrating between buds.
- To avoid multiple applications, peak mite emergence needs to be determined
  - Degree day models exist in other countries but not U.S.

Photo: Cima sprayers-dusters

We will be developing a mite activity degree day model for the Upper Midwest

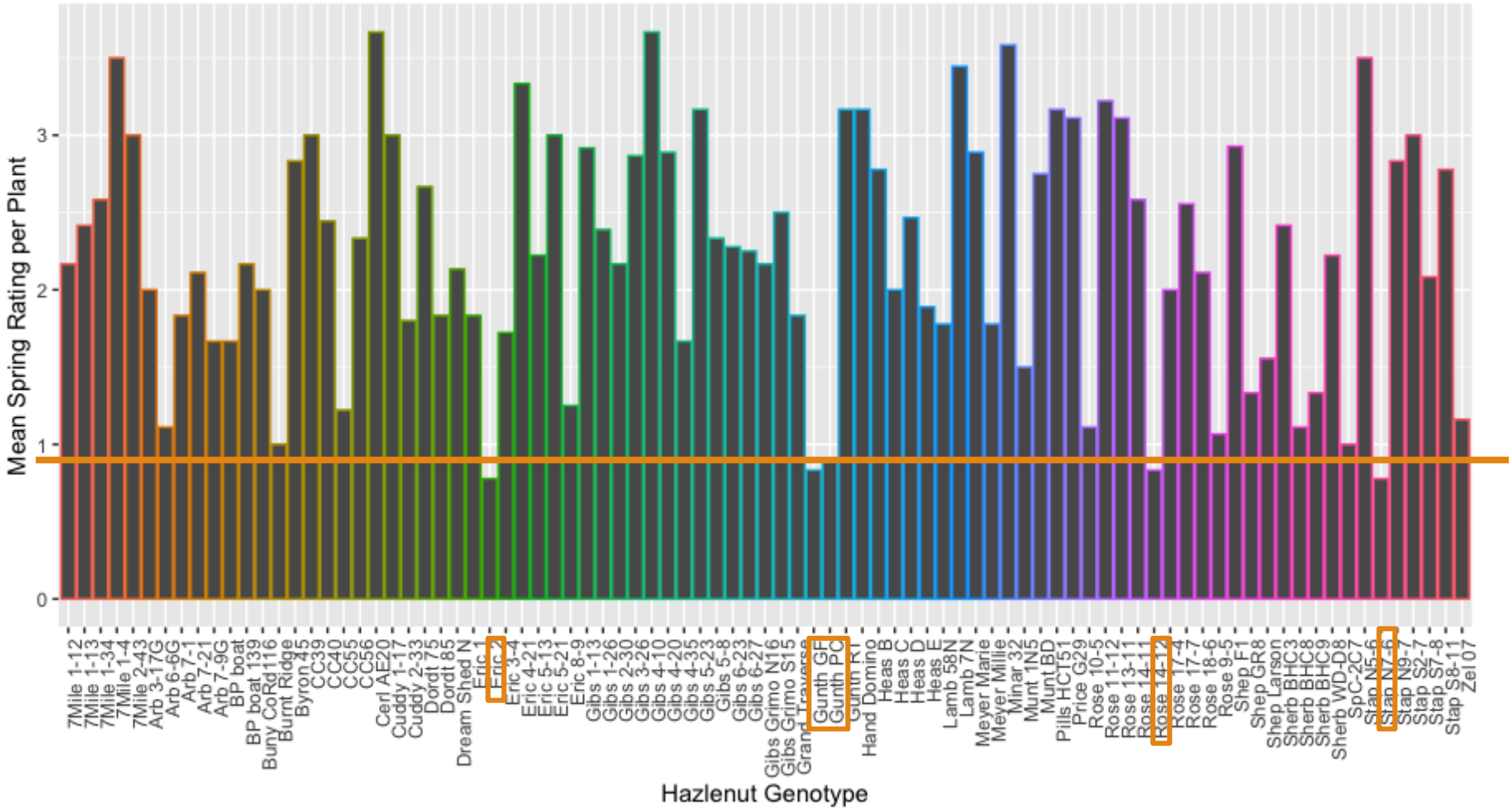
Need help from willing growers with BBM infestations!

Contact Hailey:

heyshano94@gmail.com

There has been success breeding varieties resistant to BBM

- OSU has found resistance to BBM in *C. avellana* germplasm
- Jason Fischbach and Ariadna Chediack (UW Extension) have collected data at WI plantings for last 3 years
- Preliminary results suggest there are some tolerant hybrid genotypes at Bayfield


Mean Spring Rating per Plant
0
1
2
3
Hazlenut Genotype
7Mile 1-12
7Mile 1-13
7Mile 1-34
7Mile 1-4
7Mile 2-43
Arb 3-17G
Arb 6-6G
Arb 7-1
Arb 7-21
Arb 7-9G
BP boat
BP boat 139
Burn CoRd116
Burnt Ridge
Byron 45
CC39
CC40
CC55
CC56
Cerl AE20
Cuddy 1-17
Cuddy 2-33
Dordt 75
Dordt 85
Dream Shed N
Eric 1
Eric 2
Eric 3-4
Eric 4-21
Eric 5-13
Eric 5-21
Eric 8-9
Gibs 1-13
Gibs 1-26
Gibs 2-30
Gibs 3-26
Gibs 4-10
Gibs 4-20
Gibs 4-35
Gibs 5-23
Gibs 5-8
Gibs 6-23
Gibs 6-27
Gibs Grimo N16
Gibs Grimo S15
Grand Traverse
Gunth GF
Gunth PC
Gunth R1
Hand Domino
Heas B
Heas C
Heas D
Heas E
Lamb 58N
Lamb 7N
Meyer Marie
Meyer Millie
Minar 32
Munt 1N5
Munt BD
Pills HC151
Price G29
Rose 10-5
Rose 11-12
Rose 13-11
Rose 14-11
Rose 14-12
Rose 17-4
Rose 17-7
Rose 18-6
Rose 9-5
Shep F1
Shep GR8
Shep Larson
Sherb BHC3
Sherb BHC8
Sherb BHC9
Sherb WD-D8
SpC-2C7
Stap N5-6
Stap N7-6
Stap N9-7
Stap S2-7
Stap S7-8
Stap S8-11
Zel 07

Summary objectives for Midwest hybrid hazelnut pest management

Filberworm moths

- Monitor to see if they are present

Nut weevils

- Rear and identify to species
- Determine infestation rate and timing
- Examine potential nut preferences

Big bud mites

- Determine if there is resistance among current genotypes
- Create degree-day models

Brown marmorated stink bugs

- Determine susceptibility of *C. Americana* and hybrid hazelnuts to BMSB injury

Thanks to….

University of Wisconsin Cooperative Extension

- Jason Fischbach and Ariadna Chediack

University of Minnesota – Wyse Lab

- Lois Braun and Mark Hamann

USDA United States Department of Agriculture

Questions?

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