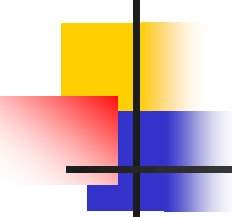


IAA ADVANCED TRAINING

Insect and Mite Pests



8:00 to 8:15 AM

8:15 TO 8:30 AM

8:30 TO 9:00 AM

9:00 TO 9:45 AM

9:45 TO 10:00 AM

10:00 TO 10:45 AM

10:45 TO 11:30 AM

11:30 TO 12:15 PM

12:15 TO 12:45 PM

12:45 TO 1:45 PM

1:45 to 2:45 PM

2:45 to 3:00 PM

3:00 TO 4:00 PM

4:00 TO 4:30 PM

INTRODUCTION (*IAA-AT Program*)

WHAT IS PLANT HEALTH CARE?

INSECT ORDERS

EXTERNAL INSECT ANATOMY

Break

INSECT GROWTH and LIFE CYCLES

DDs, *COINCIDE*, AND PHC (*DD Lab Exercise*)

LUNCH

FIELD WALK (*Sampling Exercise*)

SAP-FEEDING INSECTS and MITES

LEAF-FEEDING INSECT PESTS

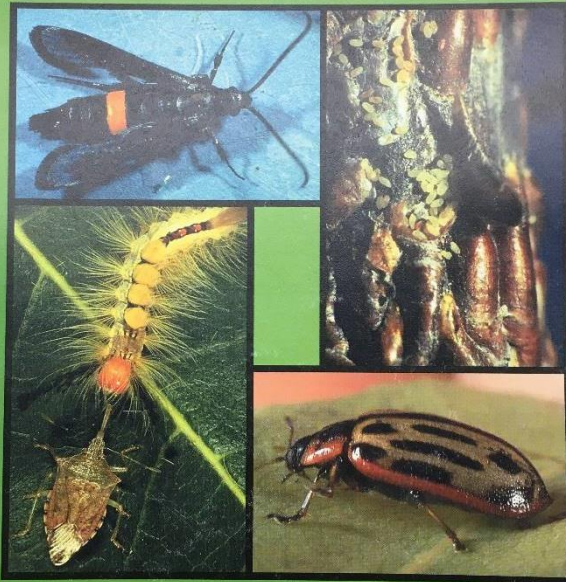
Break

WOOD-BORING INSECT PESTS

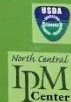
CLASS WRAP UP

HELPFUL REFERENCES

IPM (Integrated Pest Management) of Midwest Landscapes



Vera Kruschik, University of Minnesota
John Davidson, University of Maryland
Cooperative Project of NCR 193,
North Central Committee on Landscape IPM



COINCIDE:

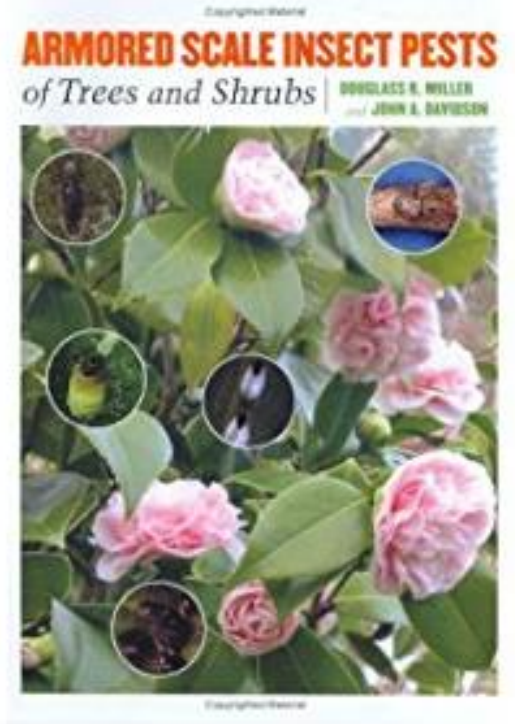
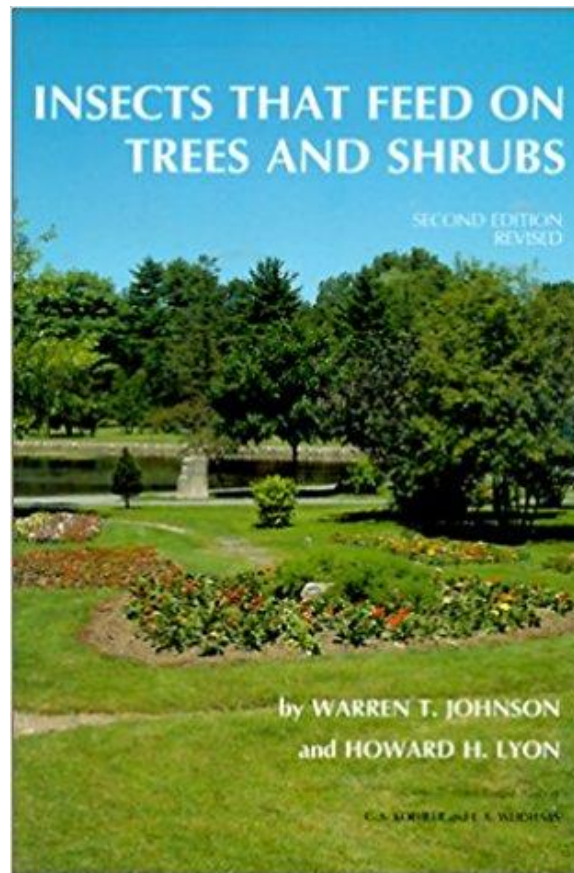
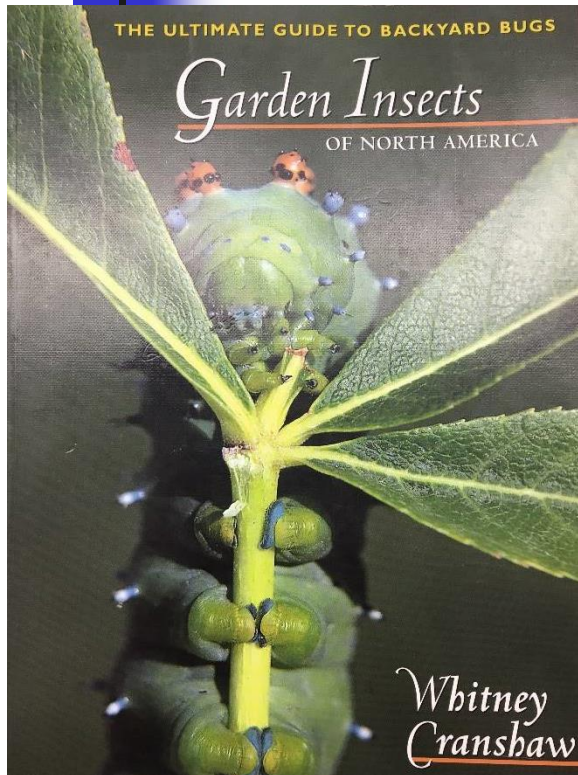
THE ORTON SYSTEM OF PEST AND DISEASE MANAGEMENT



TIMING PEST AND DISEASE MANAGEMENT WITH ORNAMENTAL PLANT DEVELOPMENT

DONALD A. ORTON
WITH THOMAS L. GREEN, PH.D.

HELPFUL REFERENCES





INSECT CLASSIFICATION

INTRODUCTION TO THE INSECT ORDERS





INSECT CLASSIFICATION

- **Phylum**-Arthropoda
- **Class**-Insecta
- **Order**-Orthoptera
- **Family**-Acrididae
- **Genus**-*Romalea*
- **Species**-*microptera*
- **Scientific name:** *Romalea microptera*

BINOMIAL NOMENCLATURE

"Naming with two names"

- Combined generic name and specific name
- Standard worldwide
- Latinized scientific name



Carolus Linnaeus (1707 – 1778)

The Scientific Name is composed of two parts: The **Genus name and the **Species** name.**

Since two names are used, we call it Binomial Nomenclature system.

BIONOMIAL NOMENCLATURE

- **Order** names end in *ptera* (Greek for wing)
 - **Diptera**
- **Family** names end in *idae*
 - **Muscidae**



INSECT ORDERS

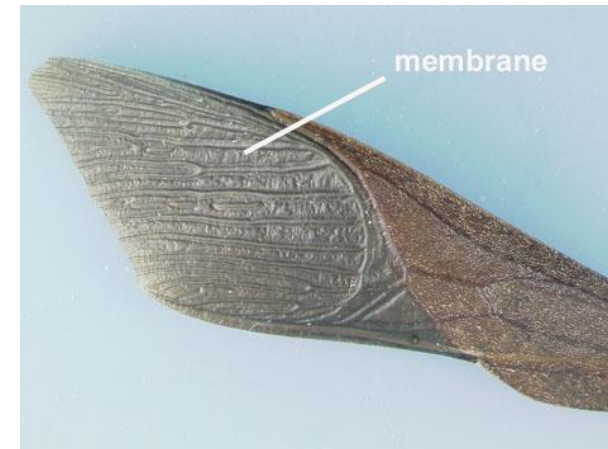


- Hemiptera – “True bugs”
- Homoptera – Aphids, scales, mealybugs
- Isoptera - Termites
- Coleoptera – Beetles
- Lepidoptera – Butterflies and moths
- Diptera – “True flies”
- Hymenoptera – Ants, bees, wasps, sawflies

HEMIPTERA

“Half Wing”

- **“True bugs”**
- **Hemelytra** or **“half wing”**
- Piercing-sucking mouthparts
- **“Shield”** on back
- Economic pests
- Insect predators



HEMIPTERA

“Half Wing”





HOMOPTERA

“Same Wing”

- **Aphids, scales, mealybugs, cicadas, leafhoppers, whiteflies**
- Similar wing structure and folded back along side of body
- **Piercing-sucking mouthparts**
- Major greenhouse and interior-scape pests
- Some produce **honeydew**
- Can multiply quite rapidly

HOMOPTERA

“Same Wing”





ISOPTERA

“Equal Wing”

- **Termites**
- **Social insects** with a **caste system**
- **All four wings of equal length**
- **Broad-waist and bead-like antennae**
- Workers and soldiers are sterile
- Queen is sole egg producer
- Cause economic damage to structures

ISOPTERA

“Equal Wing”



COLEOPTERA

“Sheath Wing”

- **Beetles**
- **Largest order of insects**
- **Sheath wing** called an **elytra**
- Second pair of wings membranous
- Chewing mouthparts
- Larval stage called “**grubs**”
- Lack prolegs
- Economic pests and beneficials



COLEOPTERA

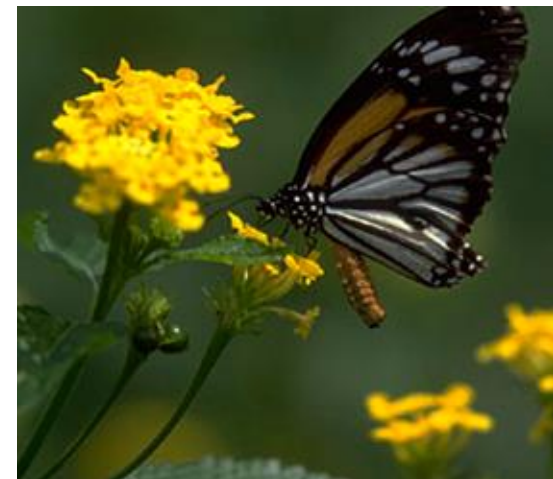
"Sheath Wing"



LEPIDOPTERA

“Scale Wing”

- **Butterflies and moths**
- Wings covered with **scales**
- **Siphoning mouthparts**
- Clubbed or feathery antennae
- Larvae called caterpillars
- Larvae have **prolegs** with **crotchets**



LEPIDOPTERA

“Scale Wing”





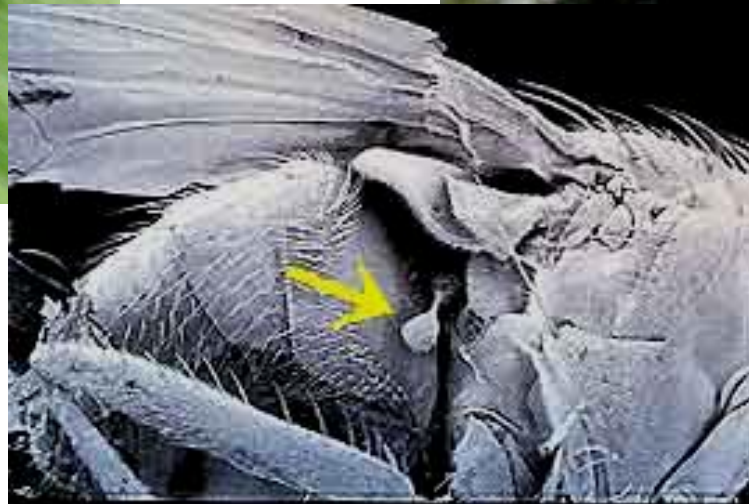
DIPTERA

“Two Wings”

- **“True flies”**
- Membranous wings
- Possess modified wings called **halteres**
- **Sponging or cutting sponging mouthparts**
- Larvae called **maggots** or **wigglers**
- **Lack prolegs**
- Economic pests and beneficials

DIPTERA

“Two Wings”



HYMENOPTERA

“Membranous Wings”

- **Sawflies, wasps, bees, ants, honeybees, and hornets**
- Membranous wings
- Elbowed or **geniculate** antennae
- Chewing mouthparts
- Larvae may have **prolegs**, but lack **crotchets**
- Economic pests and beneficials

HYMENOPTERA

“Membranous Wings”





HELPFUL WEBSITES

- insects.tamu.edu/fieldguide/orders
- ento.ento.vt.edu/facilities/oncampus/idlab/insect_orders
- bugscope.beckman.uiuc.edu/resources/insects/insectorders

