

PMA 4570/6228 Field Techniques in Integrated Pest Management

Laboratory 1: Recognizing Pests and Beneficials

The purpose of this laboratory exercise is to introduce you to some important arthropod pests and beneficials. We will discuss the importance of being able to recognize pest insects and beneficials and important characteristics to use when making identifications.

You should be able to identify all of the specimens provided by sight. You will not have to ID pictures of larvae. It is to your benefit to personally examine each specimen. I suggest taking notes of your own observations, reading descriptions from published sources, and making drawings. Any of these specimens could appear in the laboratory practical on August 4. Pictures of the Lepidopteran caterpillars (except the grape root borer) will be included along with adult specimens on the exam.

In addition to being able to sight-ID the specimens provided, you will be expected to learn some aspects of their biology relevant to pest management. Questions related to this will also appear on the laboratory practical.

Here are the things you should know:

1. Damaging stage(s) of pest
2. How is it a pest? (How does it injure its host plant? What is/are its host plant(s)?)
3. Are the beneficials predators or parasitoids?
4. For predators: which stages are predatory?
5. What arthropods do the beneficials attack?

Exercise

DUE: Thurs. July 9 by 9:30am

You have been recently hired as an extension agent. The insects you have been working with today are the main pests and beneficials in your area. Determine which of these insects are potential pests of your crop, how they are pests, and if any of the beneficials could be of use in an IPM strategy for your crop.

A few useful resources:

Pedigo, LP. 2002. Entomology and Pest Management, 4th ed. Prentice Hall: Upper Saddle River, NJ.

Metcalf, RL and RA Metcalf. 1992. Destructive and Useful Insects: Their Habits and Control, 5th ed. McGraw-Hill.

University of Florida, Entomology/Nematology Dept. "Featured Creatures" website.
<http://creatures.ifas.ufl.edu/>

Specimens for sight ID

Pests

Arachnida

Acari

Twospotted spider mite *Tetranychus urticae* (box 2 slides)

Insecta

Orthoptera

Mole cricket *Gryllotalpidae* (box 2)

Hemiptera

Silverleaf whiteflies *Bemisia tabaci* biotype B (= *B. argentifolii*)
(box 1 vial)

Southern chinch bug *Blissus insularis* (box 2)

Cottony cushion scale *Icerya purchasi* (box 1 vial)

Glassy-winged sharpshooter *Homalodisca coagulata* (box 1)

Thysanoptera

Flower thrips *Frankliniella* spp. (box 2 slides)

Coleoptera

Colorado potato beetle *Leptinotarsa decemlineata* (box 2, fig. 1)

Japanese beetle *Popillia japonica* (box 2, fig. 2)

Diaprepes root weevil *Diaprepes abbreviatus* (box 2, fig. 3)

Sap beetles *Carpophilus* spp. (box 2, fig. 4)

Masked Chafer *Cyclocephala parallela* (box 2, fig. 5)

Diptera

Caribbean fruit fly *Anastrepha suspensa* (box 2, fig. 6)

Mediterranean fruit fly *Ceratitis capitata* (box 2, fig. 6)

Yellow fever mosquito *Aedes aegypti* (box 2, fig. 7)

Lepidoptera

Southern armyworm *Spodoptera eridania* (box 1, fig. 7)

Beet armyworm *Spodoptera exigua* (box 1, fig. 8)

Fall armyworm *Spodoptera frugiperda* (box 1, fig. 9)

Tobacco budworm *Heliothis virescens* (box 1, fig. 10)

Cabbage worm *Pieris rapae* (box 1, fig. 11)

Diamondback moth *Plutella xylostella* (no adult, fig. 12)

Cabbage looper *Trichoplusia ni* (box 1, fig. 13)

Velvetbean caterpillar *Anticarsia gemmatalis* (box 1, fig. 14)

Corn earworm *Helicoverpa zea* (box 1, fig. 15)

Grape root borer *Vitacea polistiformis* (box 1, fig. 16)

Beneficials

Arachnida

Phytoseiidae

Predatory mite *Neoseiulus californicus* (box 2 slides)

Insecta

Neuroptera

lacewings (Chrysopidae) (box 2, fig. 17)

Hemiptera

Spined soldier bug *Podisus maculiventris* (box 1)

Minute pirate bug
Big eyed bug

Orius insidiosus (box 2)
Geocoris sp. (box 2)

Cleoptera
Lady beetles

Hippodamia convergens (box 2, fig 18))
Coleomagilla maculata (box 2, fig. 18)

Diptera
parasitoid
Hymenoptera
parasitoid
parasitoid

Ormia depleta (box 2)
Diadegma insulare (box 2)
Cotesia plutella (box 2)



Fig. 1

www.wildanimals.com



Fig.2

homeharvest.com/milkyspore.htm



Fig. 3

www.insectscience.org/3.9/ref/figure3.html



Fig. 4

www.ca.uky.edu/entomology/entfacts/ef207.asp



Fig. 5

cals.arizona.edu/maricopa/garden/graphic/bugs/mchafergrub.jpg



Fig. 6 Drawing of a typical fruit fly maggot.

www.azda.gov/images/clip_image002_0026x.jpg



Fig. 7

www.afpmb.org/pubs/Field_Guide/field_guide.htm



Fig. 8

J. L. Capinera www.hos.ufl.edu/vegetarian/05/February/Rondon.htm



Fig. 9

extension.missouri.edu/.../ipm1025insect.htm

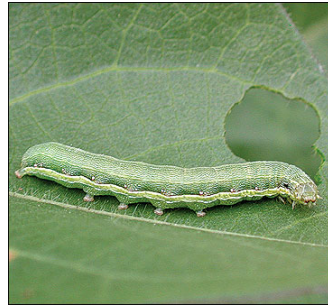


Fig. 10



Figure 4. Tobacco budworm

Fig. 11

www.aces.edu/pubs/docs/A/ANR-1121/



Fig. 12

University of Illinois organicgardensite.com/bugs-harmful/cabbage-worms/



Fig. 13

www.ag.auburn.edu/aaes/communications/highlights/fall96/cabbage.htm



Fig. 14
insects.tamu.edu/extension/youth/bug/bug092.html



Fig. 15
entweb.clemson.edu/cuentres/cesheets/soybean/ce54.htm



Fig. 16
www.life.uiuc.edu/ib/109/Insect%20rearing/corn%20earworm.html



Fig. 17
entweb.clemson.edu/cuentres/cesheets/fruit/ce213.jpg



Fig. 18
www.biocontrol.ucr.edu/AvocadoThrips.html



Fig. 19
This image shows an adult and larvae of *Hippodamia convergens*.
The larvae of other ladybird beetles are similar.
www.ca.uky.edu/entomology/entfacts/ef105.asp