

Introduction to Applied Entomology

University of Illinois

Labs 1-3

Lab 1:

Introductions

Discussion: how to collect, store, and prepare specimens for insect collections

- To obtain specimens: use aerial nets, sweep nets, aquatic nets, hand-picking, collection around lights, extraction from soil, and more. We recommend transferring specimens into a plastic bag and killing most by freezing. If you want a killing jar that uses ethyl acetate as a killing agent, we will provide one.
- ALWAYS record the date, location, and host plant (if specific) on or in the container (plastic bag) in which you place the specimens.
- Adult insects can be held in a plastic bag and killed by freezing them for 72 hours or longer. Do not place heavy items on top of the bags ... frozen insects are brittle and fragile; they break easily. (If you have the space, you may want to put the bags of frozen insects into a small box to protect them from being crushed by your roommate's ice cream.) Frozen insects will "keep" just fine in a sealed bag in the freezer for several weeks ... do not take them from the freezer until you are ready to pin them or point them.
- Very small insects and immature stages of all insects may be preserved in 70-percent ethyl alcohol (*aka* ethanol). Do not use rubbing alcohol, which is isopropyl alcohol.
- Do NOT freeze caterpillars, grubs, maggots or similar soft-bodied immature stages to kill them (they'll come out of the freezer mushy). Instead kill them by dropping them into boiling water for 15 seconds, then pluck them out with forceps and preserve them in alcohol. If you can't stomach the boiling-water step, kill them by placing them directly into a vial of alcohol (but expect them to darken and shrivel up, at least a little).
- We will demonstrate methods of spreading butterflies, pinning, pointing, etc. in later labs. Accurate labeling is essential; labels include the location and date of collection, the host plant or habitat (for example, ex: corn, boxwood, roadside grasses, water), and the collector's name. Identification information is recorded on a second label.

Microscopes

- You will most often use dissecting scopes. Use two hands to carry them; adjust the eye pieces to fit your eyes, and always start on the lowest power of magnification. You must learn to use a microscope in order to see the features that allow identification of insects.
- Practice session: identification of key distinguishing structures using a dissecting scope.

Collecting equipment: Students will check out a net, pinning box, pins, and vials of alcohol.

Lab 2-3:

These are the only collecting trips that we make during lab section hours. Tentative locations are: (1) University of Illinois Fruit research Farm and Student Sustainable Farm at the corner of Windsor Road and Philo Road in southeast Urbana and just south of Windsor Road between Lincoln Avenue and Race Street in southern Urbana, with a possible additional stop at an alfalfa

field; and (2) University of Illinois Vegetable Crops Research Farm at the corner of First Street and Windsor Rd. This outing also will include the collection of soil and litter samples to be placed into Berlese funnels for the extraction of small arthropods.

Topics covered in addition to collecting:

- Examples of insect injury or damage in specific crops.
- Sweeping as a method to assess insect densities in crops -- soybeans and alfalfa are examples of crops monitored in this way.
- Percent defoliation as an "index" of insect density -- soybean sampling uses this method. Also used in forest entomology and urban entomology.
- Pheromone trapping for insect pests; examples to include codling moth and oriental fruit moth
- Differences in nets used to "sweep" plants and those used to catch insects in flight.

Pointers for pinning and labeling insects

The essential label for an insect specimen provides the location and date that the insect was collected and the name of the collector. This is the format you are to use for your labels ...

USA IL Champaign Co.
12 September 2011
Ex: soybean
J. Student

The third – the host plant or specific site from which the specimen was collected – is optional; provide if possible

Printed labels should be small ... 4-, 5-, or 6-point fonts are recommended ...

USA IL Champaign Co.
12 September 2011
Ex: soybean
J. Student

Two key points about printing labels ... (1) If you use an ink-jet (versus laser jet) printer, you will be unable to print small fonts clearly, so print labels at a size where the clarity is good, then photo-reduce them on a photocopy machine. (2) If you use an ink-jet (versus laser jet) printer, the ink will smudge when touched and it will dissolve in alcohol ... you must photocopy these labels, both for pinned specimens and for placing them in vials.

Cut the labels as closely as possible to the edges of the printed area ...

This ...

USA IL Champaign
Co.
12 September 2011
Ex: soybean

Not this ...

USA IL Champaign Co.
12 September 2011
Ex: soybean
J. Student

If you can identify the family name for a specimen, that information goes onto a second label ...

Coleoptera:
Chrysomelidae

For vials, you will always place 2 labels into each vial (back to back) ... one will be the data label (location, date, collector), the other will be the identification label that will include at least the name of the order (capitalized); include family name ONLY if you are certain.

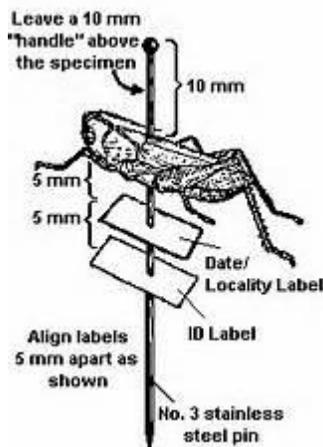
Pin, point, or alcohol?

Some insects shrivel and/or discolor badly when pinned, and should therefore either be preserved in 70% ethanol, properly dehydrated for mounting (freeze-dried ... not practical for this class), or placed on microscope slides (also an approach we will not use for this class). (2) Others are simply too small or too slender to be pinned and should be point-mounted instead.

Adults of almost any macroscopic (> 2 mm) Odonata, Hemiptera, Homoptera, Mecoptera, Hymenoptera, Diptera, Lepidoptera, and Coleoptera can be pinned or pointed ... with a few exceptions such as scale insects and aphids). For insects under 2 mm and for immature stages of all orders, storage in alcohol is standard. Additionally, adults and immatures of Ephemeroptera, Plecoptera, Isoptera, Psocoptera, and Trichoptera should be preserved in alcohol.

For the correct location to push the pin through specimens in different orders, see http://extension.oregonstate.edu/umatilla/sites/default/files/PINNING_INSECTS.pdf.

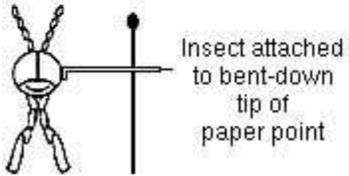
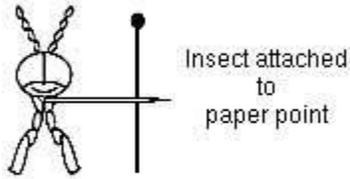
Placement on pins: Insects should be “run up” on pins using a pinning block so that there is about 10 mm (~1/4 inch) between the head of the pin and top of the insect’s body. This allows addition of two labels beneath the specimen, with space between them so that the lower label is clearly visible. The upper label provides collection data (location, date, and collector); the lower label provides identification (for this class, order and family – if known). Labels are oriented so that the top line of the label is to the right and the label is parallel with length of the insect.



Pin versus point ... The rule of thumb is that anything much smaller than an average lady beetle (6-7 mm) should be point-mounted, and anything that is skinnier than 3 mm, as well, no matter how long it is.

Insects that are “pointed” are glued to a small triangular piece of cardstock paper. The point should be glued to the right side of the insect or to the ventral surface, with the broad base of the point to the right of the insect.

▲ Shape and size of paper point



The paper point should be about 10mm or ~1/4 inch below the head of the pin. Pin the pointed insect through the data label as illustrated below.

