

BIOL 322 ENTOMOLOGY, Fall 2022
INSTRUCTIONS AND MARKING CRITERIA FOR INSECT COLLECTION
DUE NOVEMBER 25, 2022

TEXT: Marshall SA. 2017. Insects. Their natural history and diversity. 2nd edition. Firefly Books Ltd., Buffalo, NY

LEARNING OBJECTIVES: The insect collection assignment will help you

1. become familiar with habitats where insects are found.
2. practice techniques for collecting insects.
3. learn methods for presenting adult insects for display.
4. improve your insect identification skills.
5. contribute to the long-term documentation of biodiversity.

NOTE: The collections will normally remain the property of UNBC. If you would like to keep your collection at the end of the class, please let me know in advance.

REQUIREMENTS: To achieve those objectives, your collection should focus on relatively large, adult specimens. Up to five species or life stages that are normally collected and stored in ethanol, or that are too small to view without the aid of a microscope, may be included in your collection.

The minimum requirements are:

1. at least 30 specimens representing eight (8) or more orders, and 15 or more families.
 - a. You may submit more than 30 specimens, but you must clearly indicate the 30 specimens on which you want your mark to be based.
2. all of the specimens must be members of the subphylum Hexapoda (no spiders, mites, ticks, centipedes, millipedes, snails, etc.!).
3. a maximum of five (5) specimens may be preserved in ethanol.
4. three (3) or more of the 30 specimens must be identified to the species level (at least tentatively).
5. each specimen must be correctly mounted, preserved and presented
6. each specimen must be correctly labelled
7. field notes must be submitted with each specimen (numbering the specimens is helpful), including when and where the animal was collected, who collected it, and data about habitat, host plant, collecting method, and other pertinent natural history information. A spreadsheet will be provided for submitting this information, but you should keep careful notes in the field as well.

EVALUATION: Each of the 30 specimens will be evaluated, and will be worth a maximum of 5 points. Marks will be deducted for problems with presentation, missing or misidentified orders/families/species, and errors in mounting, preservation, and labelling. The field notes will be allotted 50 points, for an overall total of 200 points.

MARKING CRITERIA FOR THE INSECT COLLECTION

MARKING

Deductions will be made as follows:

Presentation:

Excellent	-0
Very Good	-10
Good	-20
OK	-30
Poor	-40

Missing Order/Family

Missing Order	-20/Order
Missing Family	-10/Family
Missing species identification	-2/Species

Specimens:

Pin positioned in the wrong body part	-2.0
Specimen not level on pin	-1.0
Specimen and/or label at the wrong height on pin (use pinning blocks)	-1.0
Specimen pointed incorrectly	-2.0
Inappropriate pin size for specimen (e.g., a #2 pin in a tiny insect)	-1.0
Specimen lightly damaged (i.e. 1 antenna, or leg or part of leg missing)	-1.0
Specimen moderately damaged (e.g. > 1 leg missing)	-2.0
Specimen severely damaged (wings torn, several legs missing)	-4.0
Wings of spread specimens sagging or not in correct position	-2.0
Specimen or label incorrectly oriented	-3.0
Label too large or small	-1.0
No label	-4.0
Missing information on label	-1.0
Specimen misidentified (Species level)	-1.0
Specimen misidentified (Family level)	-2.0
Specimen misidentified (Order)	-5.0

Total:

150 points

NOTE: If you have specimens that are in good condition, but suffer from other problems as per the list above, please, see the instructor for advice on correction.

Field Notes:

Completeness	/20
Universality	/20
Meaningfully indexed to specimens	/10

Total:

50 points

LEGAL AND ETHICAL CONSIDERATIONS:

No collecting may occur in national, provincial, regional, or municipal parks, or on private land (unless you have the explicit consent of the land owner).

Please be discriminating when you are collecting insects. Do not kill specimens unless you plan to use them for your collection. Ensure that you kill insects as humanely as possible. Allow sufficient time to ensure that the insect is dead before pinning. Trading specimens is permitted, but you **MUST** identify the actual collector on the label (no marks will be lost for traded specimens), and provide genuine collecting data.

SAFETY POLICIES: In this course, you will be required to participate in an independent project collecting insects. This will require working outside. You are responsible for preparing yourself for any safety issues that you may face. You must also be familiar with and accept the University's Student Responsibility Statement (reproduced below) – it is implied that by participating in this course you agree to these terms.

The following are possible safety issues associated with doing field work in and around Prince George (taken from UNBC's "Fieldwork – Informed Consent, Agreement to Abide by Rules of Safety").

- Injuries associated with working in managed and unmanaged forests of all ages and types
- Injuries resulting from traversing over uneven or wet terrain with slip, trip or fall hazards
- Injuries resulting from contact with obstructions, projections or falling objects while on foot
- Injuries resulting from overexertion, pre-existing illness or medical condition
- Risk of attack from wild or domestic animals
- Limited emergency medical service, including ambulance service, or a possible delay in communicating an emergency
- Changes in weather conditions
- Hypothermia
- Loss or damage to personal property

This list assumes that you will simply be walking on trails and other areas near Prince George in search of insects, and is not comprehensive. **You are responsible for identifying potential risks within your individual study situation, including any that are not listed.** I recommend that you carry a cell phone, and make sure someone knows where you are going and when you will be back (typical sign in procedures). If you are driving to sites, you are responsible for making sure you know road conditions prior to departure and are prepared for poor weather driving. If you perceive risks to be too high to work safely (e.g. extreme cold/hot temperature, high wind in forests, icy road conditions), you are responsible for delaying or making alternate arrangements for work. **Do not leave collecting until the last minute, as you may attempt collection in questionable circumstances just to meet deadlines.**

University's Student Responsibility Statement

Students are responsible for informing themselves of the risks associated with field and laboratory studies. By participating in such studies they shall be deemed to have accepted personal responsibility for all such risks (including without limitation, all risks identified by course instructors/supervisors that has otherwise been made available to students), to have agreed to abide by the safety rules and procedures established by their instructors/supervisors for such activities, and to have waived the liability of the University of Northern British Columbia and its instructors/supervisors in respect of such activities.

MATERIALS: The following equipment and materials will be signed out to students at the beginning of the term. You may approach the instructor to sign out materials earlier, but this is not necessary. Materials will need to be returned to UNBC following completion of the collection (pins, paper, labels do not need to be returned). Extra equipment is available upon request.

- 1 display box
- 1 insect net with instructions
- 1 shipping box
- 150 insect pins (#0, #1, and #2)
- 1 spreading block
- 1 pinning block
- 1 container of paper strips (for spreading winged insects)
- 1 container of paper points (for mounting small insects)
- 1 16X magnifier
- 1 pair soft forceps
- 5 empty film canisters
- 5 vials of ethanol
- 1 sheet of 100 blank labels

COLLECTING AND PRESERVING: Insects can be collected almost anywhere! Your collecting kit includes a collapsible net (for terrestrial sampling), and a number of small containers to get you started. Be creative – insects are small, so can be found in relatively small patches of suitable habitat. The textbook (Chapter 14) contains basic instructions for collecting insects. More detailed instructions can be found online, e.g.,

<http://www.entsocalberta.ca/guide.pdf> or

http://esc-sec.ca/wp/wp-content/uploads/2017/03/AAFC_insects_and_arachnids_part_1_eng.pdf.

You will obtain the best result by using large, sturdy specimens. All soft-bodied insects (aphids, caterpillars, aquatic nymphs) must be preserved in ethanol. There will be enough time to meet the requirements at the start of the fall term, so collecting during the summer is not essential for an excellent grade on the collection, but it gives you more options.

It is easiest to collect insects in plastic film canisters (transparent containers are recommended) or other non-breakable containers, and to **freeze them for killing and storage**. Keep the specimens frozen until you are ready to mount them. A chest freezer is ideal, but a fridge freezer will also work. Moths and butterflies should preferably be dealt with relatively fresh, but can be preserved frozen if the collection vial is wrapped in moist paper towel, and placed in a plastic bag. This will aid in preventing freezer burn (desiccation), which essentially makes the specimen very brittle. It is recommended that you collect moths and butterflies near or after the start of the term, however, or contact your instructor for help with mounting them. **All specimens, except those preserved in ethanol, should be kept in the freezer until you are ready to pin them.** Once thawed, which takes only a few minutes, each specimen should be pinned **promptly**, and set at the correct height on the pin immediately. Any adjustments to the positioning of various body parts **must** be completed before the insect dries out. Once the specimen has air-dried, do not attempt to adjust it any further, and handle it only by the pin.

MOUNTING: You will learn how to mount and present insects in the first two weeks of the course. Each insect must be thawed (it only takes a few minutes to thaw a small insect!) and then completely mounted **while it is still flexible**. Once it has air-dried, you will be unable to adjust its position on the pin, or to move wings or other appendages, without causing serious damage to the specimen. If you are interested in learning some of the mounting techniques ahead of time, there is good information available from various online sources, *e.g.*

<http://www.entsocalberta.ca/guide.pdf>

http://esc-sec.ca/wp/wp-content/uploads/2017/03/AAFC_insects_and_arachnids_part_1_eng.pdf

<https://entomologytoday.org/2013/10/18/videos-on-how-to-pin-insects/>

<https://www.youtube.com/watch?v=QFG4ri7AiPO>

<https://extension.oregonstate.edu/sites/default/files/documents/9591/pinning-insects.pdf>

Note that some information you find online may be inappropriate for the purposes of this collection. For example, dragonflies are often preserved with wings folded to save space: you will be mounting them with wings spread. When in doubt, check with your instructor.

LABELLING: Every specimen should have label data included with it, inside the storage container, at all times! Do not assume that you will remember where/when you collected each one – write it down on a scrap of paper right away and keep it with the specimen. Writing on the outside of containers, or taping a label to the outside of the container is NOT a good practice, as the data can easily become separated from the specimen.

For the final collection, minimum labeling (location, date, collector) information is required, while secondary labels (habitat, plant, trap etc.) are optional (but strongly encouraged). See <http://www.biology.ualberta.ca/bsc/pdf/labelbrief.pdf> for more information on label standards. Labels are made of archival grade paper, and are best **hand-written in pencil**. Some blank labels are included with your kit: they are 17 mm long by 6 mm wide. Pro tip: write on the labels before cutting them out and separating them from the sheet! It is also possible to print labels using a 3-4 point sans serif (*e.g.* Arial, Calibri) font, but they must be printed on archival paper using a laser printer (not an ink jet). The sheet of labels should then be ironed gently with a clothes iron to improve the adhesion of the print to the paper. Contact your instructor for more information if you wish to use this method.

Example text, 1^o label

CAN:BC:Prince George, Hudson Bay Slough *Note Prince George is NOT abbreviated; province and country included*
[UTM or latitude and longitude coordinates] *Strongly preferred, but not required for this course*
15/VII/2016 or *Note that the month is written in Roman numerals, and the year is written in full*
LM Poirier *Name of collector – see note about trading above*

Example text, 2^o label

Under rock, edge of pond

(for this course, you may also choose to use the 2^o label to list order and family)

A species label is normally provided for collections; you will require one for only three (3) specimens.

Example species label

Dendroctonus ponderosae Hopkins

Det. LM Poirier *Name of person who identified the specimen*

Poirier, 2022