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Preparing Wing Slides for Microlepidoptera

Wing venation is an important step in identifying microlepidoptera. With a wing slide and a copy of the work by Forbes (1923) on the microlepidoptera of New York and neighboring states one can go very far in identification. Although many of the names have changed, the entities remain the same. And of course, the use of genitalia is imperative for good species identification.

EQUIPMENT AND SUPPLIES NEEDED:
You will need a dissecting microscope with a light source from below the stage so you can shine your light through the wing slide from below. A dissecting or stereomicroscope is available for $300 or less from various scientific suppliers. You will need 70% ethanol, a thin paint brush, an eye dropper, ordinary 3" x 1" glass microscope slides, cover slips, clear nail polish, bleach, water, and paper towels. I have found 11 mm square cover slips are about the right size, although 20 or 22 mm square cover slips will work, as will 15 or 18 mm round cover slips.

PROCEDURE:
A. Removing a wing set. Viewing the specimen mounted on its pin under the microscope, use direct lighting from above to illuminate where the wings join the body. You have a choice on whether to remove the right set or left set. Try to remove the set which is in worse condition or more rubbed and leave the best set for further identification. Removing the right set is better if possible since most venation diagrams are of the right set and most of the scales are on the upper side of the wing, which means it is easier to scrape them off. However, if you choose the left set you will have to turn them over.

Before removing the wings you should place a sheet of white 8 ½" x 11" paper under the microscope stage. The wings will be extremely light weight when removed and it is very easy for them to fly into the air with even the slightest wind or air movement. Even breathing too hard may make them fly into the air. If this happens they will be easier to find with the white paper. Also, at this time clean off a slide and cover slip with 70% alcohol. While viewing under the microscope you can use a razor blade or a thin forceps to break the connection at the base of the wings. Using a thin jeweler's forceps grasp the wings at the base and place them on a clean microscope slide.

B. Descaling the wing set. Look through the microscope to insure you have the wings facing up the way that you want. Using an eyedropper, place one or two drops of alcohol on each wing part, i.e., forewing and hindwing. ***All of the following procedures are done on the microscope slide. Throughout these procedures be very careful that the wings do not migrate off the microscope slide, or migrate to the side of the slide. Try to keep the wings centered on the slide as you work with them.***

Use a very fine paint brush from which you have removed most of the bristles. In fact you can usually work by removing all but one or two bristles. While keeping alcohol on the wings, gently brush them so the scales begin to come off. ***This is the critical step!*** Always keep the wings in alcohol; otherwise they will tear up. After adding a few drops of alcohol and some rubbing with your brush, take a small square of paper towel and soak up the alcohol and scales mixture that is on the microscope slide. Then place two more drops of alcohol on the wings and brush again. Then soak up the alcohol again. Repeat this until all the scales are removed from the wings. Watch out for the tip of the wing, which is very fragile and is important to use for venation. You can also use a rolling motion with the brush instead of scraping. There is less danger of tearing up the wing with this approach.

C. Bleaching the Wings. Mix a very dilute solution of bleach and water (4 parts water to 1 part bleach). With an eyedropper, place a few drops of the bleach solution on the wings and wait for a few minutes. If bubbles start to form, it means your solution is too

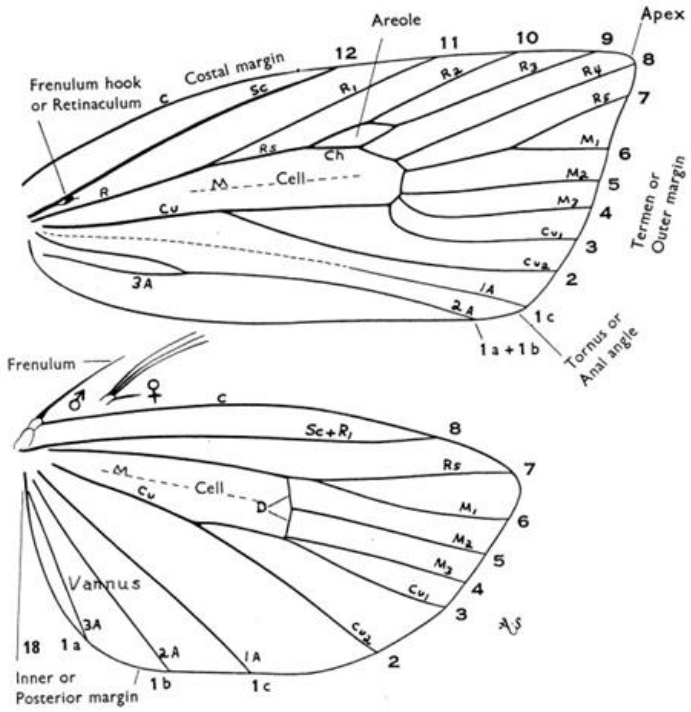

Fig. 1 generalized wing venation (from Zimmerman 1978)

strong. If you see this happening soak up the bleach solution immediately. Usually you can place the bleach solution on the wings for a minute or two, then soak it up with a paper towel. When using a paper towel, always be careful that the wings do not get stuck to the paper towel. If that happens, examine the paper towel, remove the wings with a forceps and place them back on the slide.

D. Rinsing. Place a few drops of water on the wings, wait a few minutes, then soak up with a paper towel. Do this a second time.

E. Hardening. Place a few drops of 70% alcohol on the the wings. Position the wings where desired on the slide and then soak up the alcohol with a paper towel.

F. Adding the Cover Slip. Place a cover slip over the wings and anchor it with drops of clear nail polish at each corner or at a few spots around the edge. Use only a tiny amount at each corner, otherwise it will flow under the cover slip and touch the wings.

G. Label. An ID number may be scratched on the slide with a diamond-tipped pen, or a label may be attached to the slide. Put this same number on the label on your pinned specimen. Store the slides in a slide box.

Fig. 2. *Helcystogramma hystricella* (Braun) (Gelechiidae)

IDENTIFICATION:

There is a key to microlepidoptera families in Forbes (1923) that uses venation. It is important to know the nomenclature for wing veins. Figure 1 is a sample of wing venation that includes the older all-numerical system and the modern system. The venation can be most clearly seen with light shining through the wing slide from below. Figure 2 shows two important characters: forewing with M1 arising directly from central cell and Cu1 and Cu2 stalked. These two characters, using Forbes' key to Gelechiidae, are the main characters used to take you to the species *Helcystogramma hystricella* (Braun) .

PRACTICE MAKES PERFECT:

It is highly recommended that you find some specimens that are disposable to practice on. Find some Indian meal moths, or clothes moths, or other species for which you have a lot of specimens and practice.

References

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