

Lesson 2: Insect Collection

Making an insect collection is an ideal way to learn about insects. It opens the doors to the world in which these small creatures live. The collector is able to discover things about insects that he or she may not get from books. It allows insects which are very different to be studied and compared at the same time. Collecting insects is a very interesting hobby as well. Constructing an insect collection is not difficult, but it does require some care and time. There are certain steps and procedures that need to be followed when preparing insects for display. Some standard guidelines are given here.

Collecting Insects

Preparing a killing jar: A killing jar needs to be prepared before the insects are collected. Insects should be killed in a killing jar as soon as possible after they are collected. Therefore, the killing jar should be taken along when collecting insects. Killing jars or bottles can either be made or purchased. Wide-mouth jars (6 to 16 oz. size) with airtight lids are the most common. An alternative is to carry a large test tube or slender bottle with a cork or stopper in it. The insects are killed later.

Ethyl acetate, which acts as a fumigant, can be used to make a killing jar. It can be obtained from biological or chemical supply companies. It is much safer than other types of killing agents. The ethyl acetate type of killing jar can be made easily by following the procedure listed below. See Figure 2.1.

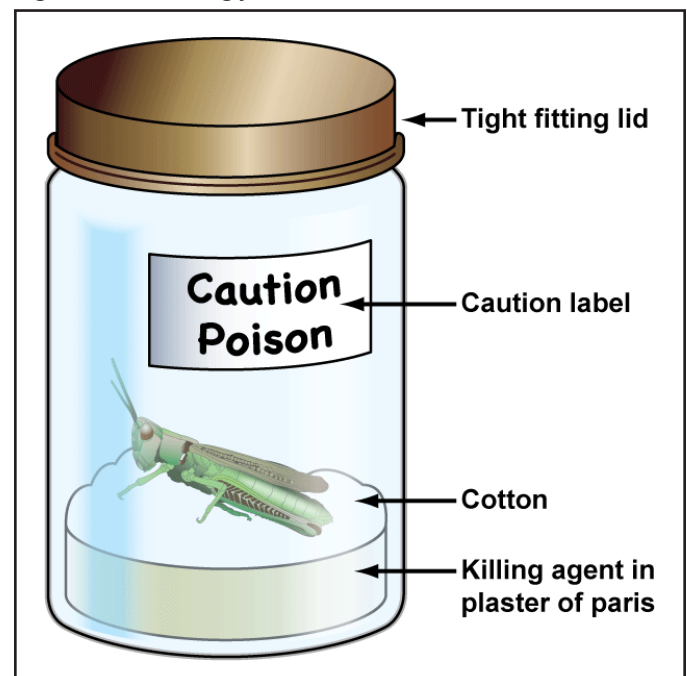
1. Make a thick mixture of plaster of paris and water.
2. Pour the mixture into a clean jar to a height of about 1 inch (20–30 millimeters). Allow it to air dry at room temperature (this requires several days) or under low heat (light bulb or lowest oven temperature).
3. When completely dry, add enough ethyl acetate to saturate the plaster of paris. With the lid on, let it stand for a few minutes. Then, pour back any excess liquid and replace the lid. There should not be any standing liquid. Be careful not to breathe the ethyl acetate fumes.

4. Place enough cotton to cover the plaster of paris. The insect should not come into direct contact with the plaster of paris.
5. Tape can be placed on the bottom and lower sides of the jar to reduce the chance of breakage.
6. Label the jar “poison.”
7. Ethyl acetate must be reapplied to the plaster of paris after several hours of collecting insects depending on how often and for how long the lid was removed. The lid should always be left on unless the collector is actually placing an insect in or removing one from the jar.

Locating insects: Insects can be found almost anywhere in the world. The more places you look, the more kinds of insects you are likely to find. Insects are commonly found in flower and vegetable gardens, grasses in lawns and fields, weeds, bushes, aquatic plants, fruit and shade trees, and animals.

Many insects can be found hiding in plants. Look between the petals in flowers and inside the stem. Leaf damage may indicate the presence of insects. If the stem has holes,

Figure 2.1 – Killing Jar



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swellings, or a dead portion, it should be split to locate larvae living there. Soil insects, which feed on roots, are often found near or inside roots. Decaying fruits, nuts, vegetables, bark, logs, and wood piles are homes of many insects. Check tree holes that are filled with water for mosquito larvae and other insects.

Flying insects enjoy sunny, calm days. Certain flies, winged ants, and termites swarm in the spring and fall, especially when it is warm and sunny after rain. Use a net to catch flying insects, or check the radiator or front grill of a car for usable specimens. Certain insects may be found beneath or on top of the water. Mud along water shorelines is also the hiding place for many insects. Like plants on land, water plants are also homes for several kinds of insects.

A lot of insects may be hiding in garden topsoil, mulch, compost piles, and forest litter. To find certain soil insects, dig down about 6 inches under grasses and in garden soil. Since insects are almost everywhere, there are many other places to find them. Outside areas like under stones, logs, plant debris, and picnic trash bins are homes of insects. Household pests may be found in garages, basements, and food storage areas. Parasitic insects live in bird feathers and animal skin and fur. Some insects are not present during the day, but may be found at night.

Catching insects: The simplest way to catch insects is by hand. Place them in a killing jar or container. Gloves are recommended for catching insects. Many beginners may be hesitant to reach out and grab an insect because they are afraid that it might bite or sting. Although this is a common fear, it is not very likely to occur with most insects. Insects which bite do so by moving their jaws sideways and pinching, or by piercing with their beak. Actually, there are very few pinching insects capable of causing pain or breaking skin. Most biting insects cannot bite if they are grasped firmly by the sides of their body. Insects which sting do this by using a structure located at the back end of their body. Only female bees, wasps, and some ants can sting.

A net, envelopes, small boxes, forceps, a hand lens, flash lights, and killing jars are useful when gathering insects. A net is used by swinging it at insects as they go by or swinging it through vegetation or along the surface of

water. To prevent the insect from escaping, quickly turn the net handle so that the bag folds over the rim. Insects should be removed from the net as gently and carefully as possible to prevent damage. To remove insects from the net, you can 1) remove them directly by gently grasping them with fingers or a tool, 2) insert a box or bottle into the net and ease the insect into this container, or 3) work the insect into a fold in the net and place this fold into a killing jar to stun the insect directly. If the insect is one that stings, it can be worked into a fold in the net and stunned by pinching the thorax before removal.

Killing insects: Place insects immediately into the killing jar after they are captured. If the killing jar is in use, the insects can be placed into another container with a lid. It is important to kill the insects as soon as possible so that they do not damage their body parts.

Preserving Insects

Specimens are kept in killing jars until it is time to preserve them. Most insects are normally preserved by "pinning." Pinning is a way to mount and preserve insects indefinitely. Insects should be pinned immediately after they are killed. Otherwise, they become very brittle after drying and can easily break if mounted later. Soft-bodied insects, larvae, and nymphs need to be preserved in liquid. The bodies of these insects will shrivel when dried. The most common liquid used for killing and preserving these insects is an alcohol solution.

Another method for preserving insects is to keep them in envelopes. This works best for insects that have relatively slender and fragile bodies, such as dragonflies, damselflies, and crane flies. Using envelopes saves a lot of space and protects these types of insects better than mounting on pins. Envelopes can be made of paper or plastic. Label information is either written on the outside of the envelope or written on a piece of paper and placed inside the envelope.

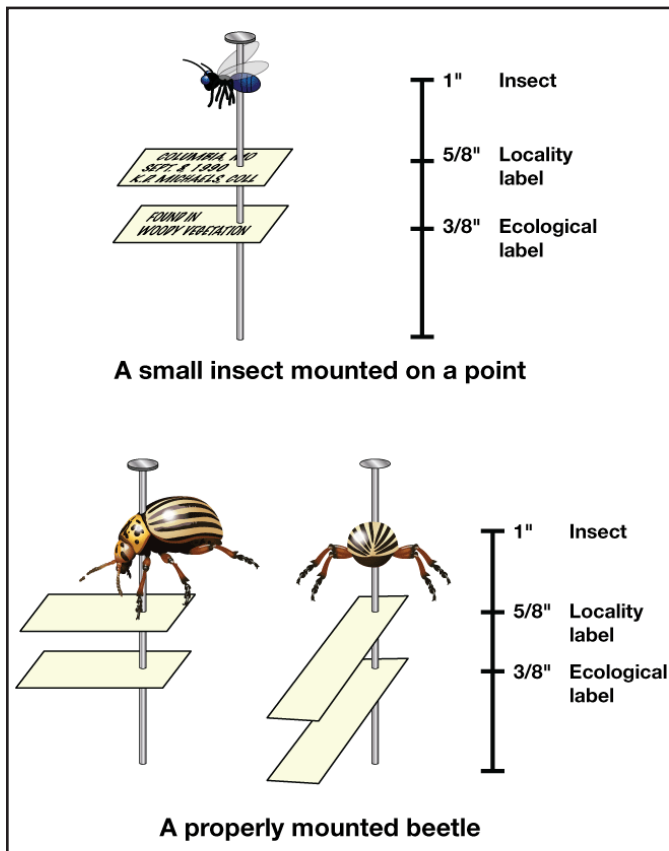
Labeling

Locality and ecological labels: Labeling is a very important part of an insect collection. The information should be accurate and written clearly. Without data a specimen

is useless. The first label, which is the locality label, *must* include the date when the insect was found and the place where it was caught. It may include the collector's name. A second label, called the ecological label, may be used. The ecological label would contain information or observations about the insect's environment or habitat.

These labels are made of fairly stiff white paper. They are about 1/4 by 3/4 inches or smaller in size. The labels are mounted on the pin at the proper heights and parallel with the insect (or point). The insects and labels could be mounted using a pinning block at the following marks: insects at the 1 inch mark, locality labels at the 5/8-inch mark, and ecological labels at the 3/8-inch mark. See Figure 2.2. They can be mounted so that they are read from either the right or left. Just make sure that all labels are read from the same direction. This helps keep the collection neat and orderly. For specimens mounted on microscope slides, the information is written on a slide label.

Figure 2.2 – Insect and Label Placement



Identification labels: An insect collection should contain some identification labels. Specimens in a collection should be arranged into groups according to insect orders. One label is used to identify each group. If the insects are labeled to the scientific level of species, an identification label is used for each individual specimen. A piece of paper about an inch square is used for the identification label. This is placed alongside a group of insects or at the base of the pin for individual insects. These types of labels contain the order of the group of insects or the scientific name of the insect, the name of the person identifying it, and the month and year when the identification was made.

Pinning

A special system has been developed for pinning insects. The procedures should be followed as closely as possible. Pinning is done with special *insect pins*, pins which are made especially for this purpose. They are sold in several sizes. The most common are Number 1 (very thin), Number 2 (thin), and Number 3 (thick, for larger insects). The simplest way to handle an insect for pinning is to hold the insect between the thumb and forefinger of one hand and insert the pin with the other hand.

Different insect types are pinned in different places. See Figure 2.3. Most insects are pinned through the thorax vertically. Beetles and hoppers are pinned through the front part of the right wing. Make sure the pin does not damage a leg as it comes through on the underside of the body. True bugs are pinned through the scutellum, if they are large enough. The scutellum is the triangular area between the bases of the wings. Otherwise, they are pinned like beetles through the right wing. Grasshoppers and crickets are pinned through the thorax between the bases of the front wings and just to the right of the midline.

Dragonflies and damselflies can be pinned in two ways. The best way is to pin them sideways. The left side should face up with the wings together above the body. The pin goes through the thorax below the wing bases. If the wings are not together when the insect is removed from the killing jar, place the specimen in an envelope with the wings together above the body for a day or two. The

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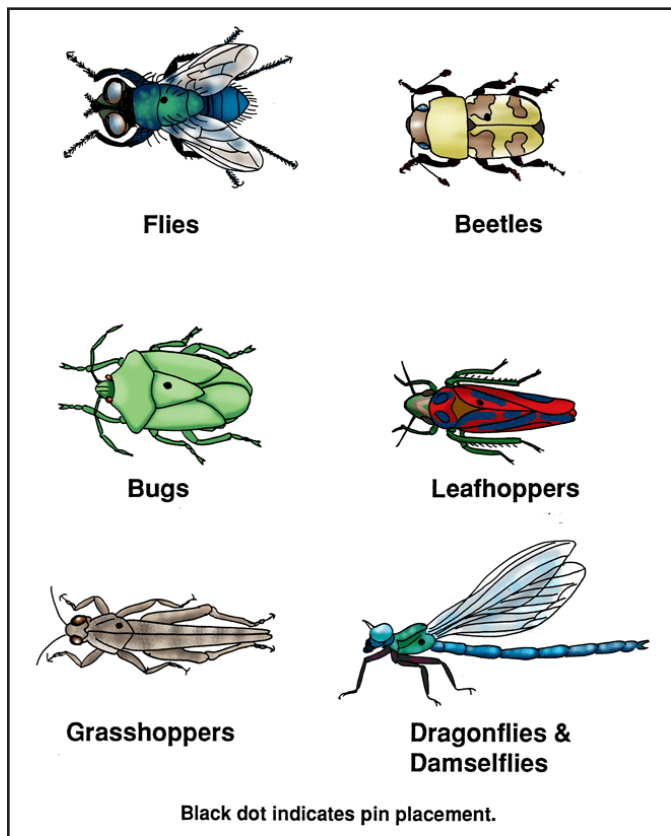
specimen is ready to pin when it has dried enough for the wings to stay in position. The other way is to pin the insect through the thorax with the wings placed horizontally.

When mounted, all of the insects and labels on pins should be the same height. The easiest way to do this is to use a pinning block. See Figure 2.4. A pinning block is usually made of wood. The block can be shaped as a solid rectangle or like stair steps. Holes are drilled to 1, 5/8, and 3/8 inches in depth.

The following procedure should be followed when using a pinning block.

1. After placing a specimen on a pin, insert the pin in the 1-inch hole.
2. Then, add the first label and insert the pin in the 5/8-inch hole.
3. Finally, add the second label, if there is one, and insert the pin in the 3/8-inch hole.

Figure 2.3 – Pinning Locations



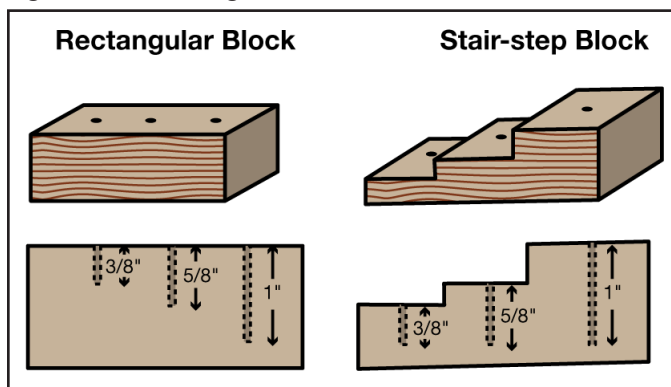
A mounted insect with two labels should look like Figure 2.2. Pinned specimens can be temporarily stored on a sheet of cork, balsa wood, or other soft material until placement into the collection.

The abdomen of some insects, such as dragonflies, may sag when pinned. One of the following techniques can be used to prevent this. The insects should be allowed to dry completely before they are placed in the collection.

1. Stick the pinned insect onto a vertical surface with the abdomen hanging down.
2. Place a small piece of cardboard on the pin just under the insect so that the abdomen is supported.
3. Insert two pins so that they cross under the abdomen. They will support the sagging abdomen.

Some insects may be too small to put a pin through. These are usually mounted on a small triangular piece of cardboard called a *point*. Points are about 3/8 inch (8 millimeters) long and 3/16 inch (3–4 millimeters) wide at the base. The insect is glued to the tip of the triangle and the pin is put through the wide base. The entire setup is then mounted on the block as described before. Be careful to glue the insect so that the body parts you want to examine are not hidden. The suggested way is to glue the insect on the right side with the head facing away from the pin. A household cement or glue should be used.

Figure 2.4 – Pinning Blocks



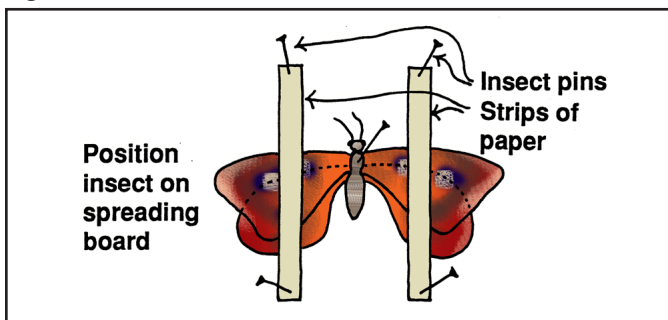
Spreading Butterflies and Moths

For most insects, the exact position of the legs and wings is not generally important as long as all of the body parts can be seen. Insects such as butterflies and moths need to have their wings spread before being put into the collection. Insects can be spread on a spreading board

or on a flat surface. To “spread” an insect on a spreading board follow the steps below. If a spreading board is not available, spread the specimen upside-down on a flat surface.

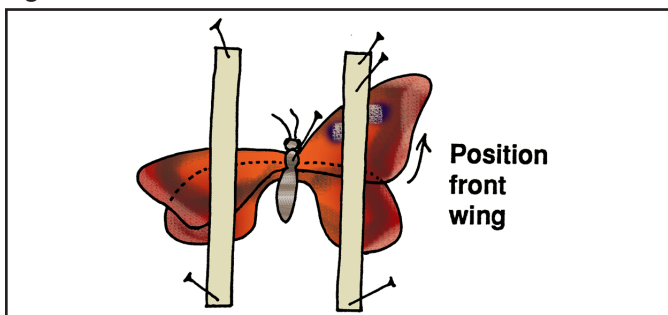
Step 1: Hold the specimen by grasping it by the thorax, the middle section of an insect. Holding it right side up, insert a pin through the middle of the thorax. Move it to the 1-inch position on the pin. The pinned specimen is then lowered onto the spreading board. The pin should go into, and maybe even through, the bottom of the groove. Push the pin through the board until the underside of the wings is even with the top piece of the spreading board. Pin narrow strips of paper over the wings on each side as indicated in Figure 2.5.

Figure 2.5



Step 2: Remove the pin on one side at the lower end of the strip of paper. Raise the front wing until the rear edge is at a right angle to the body. See Figure 2.6. Forceps, a pin, or some other tool may be helpful in doing this. Be careful not to tear or puncture the wing. When the wing is in place, insert a pin through the strip of paper just in front of the tip of the wing. Pin the lower edge of the paper strip back into place.

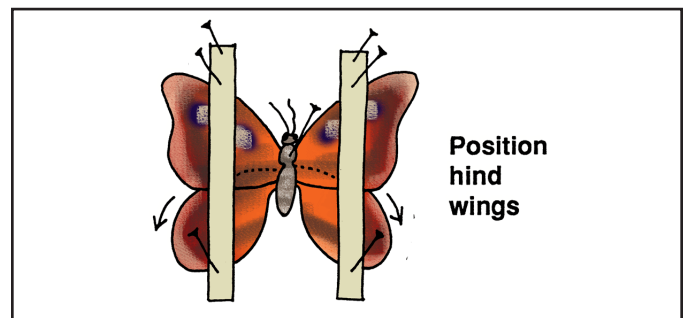
Figure 2.6



Step 3: Repeat this procedure with the other front wing.

Step 4: Use forceps, a pin, or some other tool to raise the hind wing on one side until the space between the two wings is reduced, as shown in Figure 2.7. The front and hind wings of these insects will overlap at the base with the front edge of the hind wing under the rear edge of the front wing. Move the pin in the lower part of the paper strip until it is just below the tip of the hind wing.

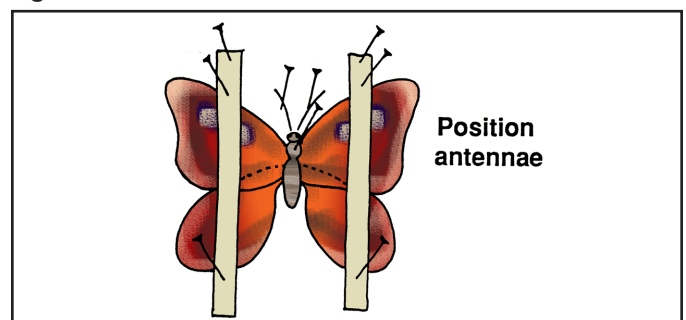
Figure 2.7



Step 5: Repeat this procedure with the hind wing on the other side.

Step 6: Now, position the antennae so that they appear balanced. Put pins alongside of the antennae to hold them in place. See Figure 2.8.

Figure 2.8



Step 7: Fasten the legs close to the body at right angles to the body. This is done by placing a strip of paper across the entire body.

After spreading the wings, the insect is left in position until it dries. How long it takes the insect to dry completely depends on the size of the insect, the temperature, and

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humidity. A large butterfly may take several days at room temperature or an hour with heat. Ovens or electric lamps are used as sources of heat. A specimen is dry when the abdomen is stiff when gently touched with a pin. If the abdomen is still flexible, the insect is not dry enough.

Collection Arrangement and Care

Once the insects are collected, preserved, pinned, and labeled, they need to be kept in an orderly and safe way. There is no exact way to organize an insect collection. The way the insects are arranged will depend on the size of the collection, the types of insects collected, and the preference of the individual. Whatever way it is done, the collection should be neat and orderly, and the insects easily seen. Specimens are kept in some sort of display for study and storage. There are several different kinds of mounting displays. These mounting containers can be bought at a local supply store or handmade.

Mounting box: The most common type of display for pinned insects is a mounting box. The box is made of wood or heavy cardboard. Boxes can be any size but usually measure about 9 x 12 x 3 inches and have a tight fitting lid. The bottom is lined with a material that is sturdy enough to securely support the pins but soft enough to easily insert the pins. These materials are usually sheet cork, balsa wood, Styrofoam, or corrugated cardboard.

Riker mounting: The Riker mount is a box with one piece of glass on the top. The box is filled with cotton and the insects are mounted on the cotton just under the glass. A small depression is made in the cotton before putting in a thick-bodied insect. Insects in a Riker mount can be seen easily and the mounts handled without damaging the samples. However, only one side of the specimen can be seen. Also, some insects, such as moths, tend to fade after a lot of exposure to the light.

Glass mount: The glass mount is another kind of display. This type has two pieces of glass, one on the top side and one on the bottom side of the box. The size and the materials used for glass mounts are similar to Riker mounts. Glass mounts contain no cotton. This makes it

possible to see both sides of an insect specimen. Each glass mount contains only a few insects. They are relatively inexpensive and provide a safe, attractive method for storing and displaying insects.

Plastic mount: Plastic mounts are made of two sheets of thick plastic. The insect is mounted between the plastic. Then, the edges are sealed with acetone or tape. An alternative type of plastic mount is made by embedding an insect in a block of plastic. This is a very involved process, but the end product is very attractive, durable, and permanent.

Slide mount: Insects or parts of insects can be studied in detail by mounting them on slides. Small insects, insects that shrivel up when dried, and soft bodied insects are commonly mounted on slides. Also, parts of insects such as the wings, mouth parts, genitalia, legs, and antennae are mounted on slides for further study. Some specimens have areas that are dark colored. Usually these areas are treated before mounting. The treatment removes some of the dark coloring so that it can be seen well. Samples are mounted on microscope slides using different chemicals. These chemicals have different functions. More information on the purposes of these chemicals can be found in technical books on the subject.

Insect collections need to be protected from beetles and other pests that can attack and damage the specimens. Collections should be examined regularly for signs of damage. Special pest repellents can be bought to treat collections. For a box display, the repellent can be placed in a small pillbox or wrapped in a piece of cloth. It is then placed securely in one corner of the box. For Riker mounts, the repellent can be placed underneath the cotton. Specimens sealed in glass mounts or in plastic need to be treated with repellent before the mount is sealed.

Insect specimens are very brittle when they are dry. They always need to be handled with care. Otherwise, the legs, antennae, wings, and other parts may be broken off. However, if parts do get broken off, use glue or cement to replace them.

Summary

Making an insect collection is an ideal way to learn about insects. It allows insects that are very different to be studied and compared at the same time. Constructing an insect collection involves making a killing jar and locating, preserving, pinning, mounting, labeling, and arranging the insects. The proper techniques should always be followed when making an insect collection. When properly done, a collection can last a very long time. An insect collection is a great adventure into the world of insects.

Credits

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