Methods of insect sampling

Topic:
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Methods of Insect Sampling

- **For insect sampling and collection different types of insect nets and traps used.**
- **Insect nets**: A collecting net is composed of some sort of net bag made of cloth or fine mesh that is attached to a wire hoop.
- There are three basic types of insect collecting nets.
- **Aerial nets**
- **Sweep nets**
- **Aquatic nets**

Aerial Nets

- Aerial nets typically have net bags that are composed entirely of some type of meshed material and often have a lightweight handle.
- Aerial nets with larger hoops are better for collecting large and fast moving insects such as dragonflies and butterflies, while those with small hoops are better for bees, flies, wasps, and other smaller insects.
- Aerial net bags are usually white in color, but black net bags are also available.

Sweep Nets

- Sweep nets are usually made of a heavy material (such as canvas) that can be dragged through dense vegetation without being damaged.
- A combination of aerial and sweep nets are also commonly used, with the majority of the net bags being made of a heavier cloth.

Aquatic nets

- Aquatic nets also have heavy duty net bags and handles and have square to triangular thick wire hoops.
- Aquatic insects are collected by dragging the net through the substrate of aquatic habitats.
- Depositing the accumulated material into a large white pan to sort through.

Killing jars or Collection jars

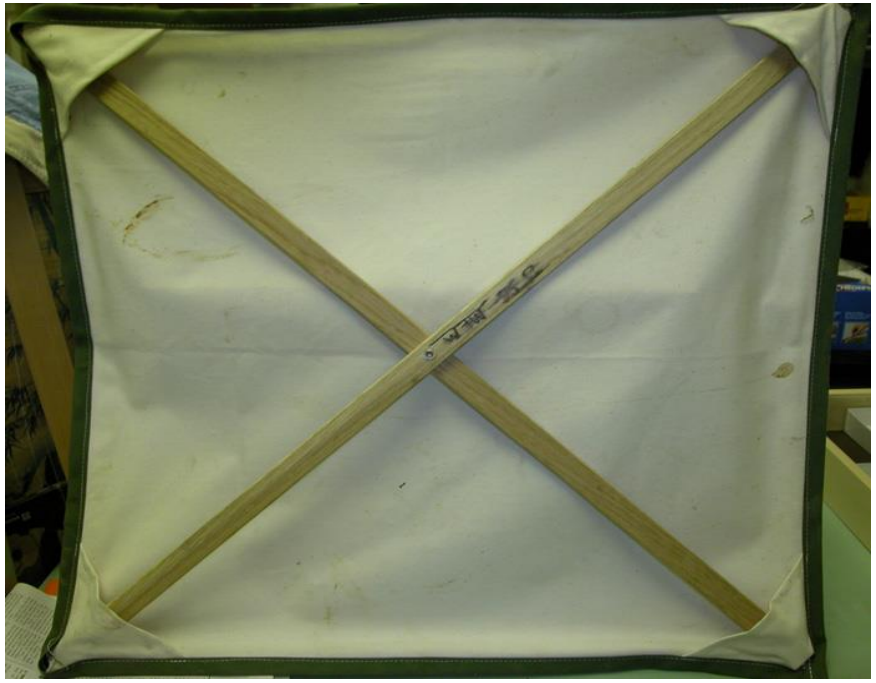
- Collecting jars or killing jars are simply any jar that has some sort of killing agent in them.
- Various sized jars used with two different types of killing agents, ethyl acetate and potassium cyanide.
- **Ethyl acetate jars**
- Ethyl acetate jars have a layer of plaster of Paris at the bottom approximately 1/2 to 1 inch thick. Ethyl acetate is poured into the jar until it saturates the plaster. A folded wipe is place into the jar to help separate insects. Use ethyl acetate jars for killing beetles.

❖Cyanide jars

- The cyanide jars have a thin layer of dry potassium cyanide at the base of the jar (about a 1/4 inch thick), followed by a layer of sawdust (about 1/2 inch thick), and topped off with a layer of plaster (1/2 inch thick) which is poured wet over the sawdust. The jars are placed under a vented fume hood with the lids off until the plaster thoroughly dries.
- After the plaster is dry, the base of each jar is taped with either masking tape or strapping tape.
- The cyanide is activated by adding a couple of pinches of water to the dried plaster, which then soaks through to the cyanide below releasing deadly fumes.

Bating Sheet

- A beating sheet is basically just a piece of heavy duty cloth stretched across two diagonal pieces of wood joined at the center. They can be purchased or made. Beating sheets can vary in size, but a typical beating sheet would be about 3 feet square.



Aspirator

- An aspirator is a device used for capturing small insects. The basic design of an aspirator includes a vial (usually plastic) and a tight fitting cork, rubber stopper, or other cap with two metal tubes running through it.
- One of the tubes has a rubber hose several inches long connected to it and a piece of fine mesh affixed to the other end of the tube inside of the vial.
- To collect insects, one sucks air through the rubber hose and points the other tube at the insect and the insect is sucked into the vial. Because the end of the tube that is used to draw air through has mesh over its end, insects in the vial are not sucked into ones mouth.

Pitfall traps

- There are many variations of pitfall traps, but in its most basic form, a pitfall trap consists of some type of cup or other container (gallon bucket, for example) that is submerged in the soil and partially filled with a preservative.
- Insects and other organisms crawling about on the ground simply walk into the container and then cannot get out. Pitfalls can be covered to help prevent excessive rain from overflowing the cup.

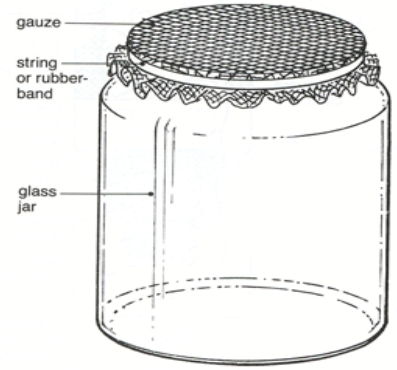
- **Artificial Refuges**
- Many insects, especially beetles, are successfully found under stones, planks, or rotten logs. Providing such refuges, as pieces of wood, card board can be used to collect various insects.

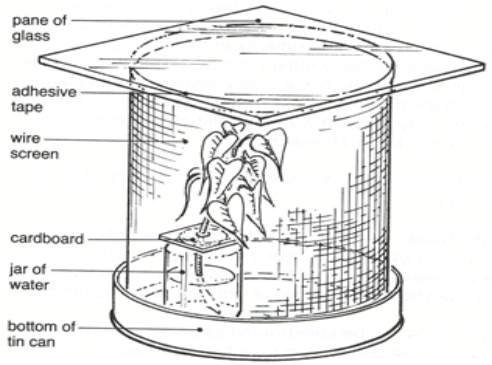
- **Light Traps**

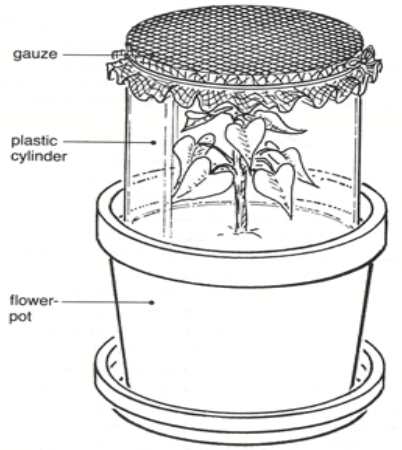
With light traps, advantage is taken of the attraction of many insects to a light source. Using various wavelengths as the attractant.

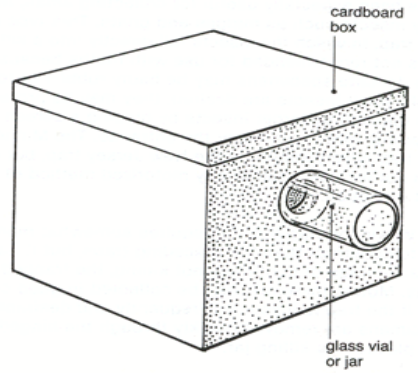
Emergence and Rearing Traps

- An emergence trap is any device that prevents adult insects from dispersing when they emerge from their immature stages in any substrate, such as soil, plant tissue, or water.
- A simple canopy over an area of soil, over a plant infested with larvae, or over a section of stream or other water area containing immature stages of midges, mayflies, and other arthropods will secure the emerging adults.









- **<u>Brown sugar yeast bait.</u>**
- One of the easiest ways to collect many species of beetles (also called sap or picnic beetles) is by putting out some type of bait, especially something sweet and rotting. A common method we use is putting a mixture of water, brown sugar, and yeast (mixed in a ratio of 2 cups of water, 1 cup of brown sugar, and 1 packet of yeast) in either a mason jar at the base of a tree or in some type of container which is hung from a tree limb.

- Many insects other than sap beetles are collected in these bait traps including ants (especially carpenter ants), moths, flies, flower feeding scarab beetles, etc.

- **<u>Carrion/dung Bait.</u>**
- There are many species of insects that specialize in feeding on carrion or dung.
- Carrion feeders include such things as carrion beetle, small carrion beetles, some sap beetles, and many others.
- An easy way to sample either carrion or dung feeders is to hang a small mesh bag with dung to the tree branches. Insects attracted to the bait will fall into the pitfall trap.

- **Beer/Molasses Bait.**
- A mixture of beer and molasses of equal parts can be prepared and simply placed in a bucket and hung from a tree limb.
- This sort of bait is good for attracting various beetles, especially some longhorn beetles.
- Insects fly to the bait and land in it. They have to be strained out with some type of strainer; a small kitchen strainer works fine.

- **Wine/Fermenting Fruit Bait.**
- This sort of bait is basically an amalgamation of cheap red wine, sugar, and rotting fruit.
- Just mash the fruit up and mix it with the wine and sugar in a bucket and let it sit for a few days or more.
- The resulting mess is applied to tree trunks or to rope.
- The rope can actually soak in the solution and be pulled out and strung between trees in a forested type setting.
- This sort of bait is used for night collecting and is used primarily for the collection of certain moths.

- **Miscellaneous Methods of Capture**

- Many beetles and their larvae inhabit timber, both rotting and sound, and flat-bugs (Aradids), beetles, cockroaches, etc. are to be found beneath loose bark. Turning over logs and stones reveals ground-beetles, earwigs, ants, etc.
- Leaf-mould is often rich in small beetles and bugs and Collembola.
- On the surface of flood-water and in the debris stranded by floods are often found insects brought down from higher regions.
- Tufts of sedges, grasses and rushes in swampy areas shelter concentrations of insects after flooding.

- **Most commonly used insect killing agents**

- Killing agents commonly used include ether, ethyl acetate, chloroform, and potassium or sodium cyanide.
- The first four are used in very small quantities — a single drop on the cork of a tube or on a wad of cotton-wool. With small or delicate insects, like leaf-hoppers, leaf-bugs (Mirids), small flies.
- Chloroform has the disadvantage of making many insects rigid and brittle. Insects killed with Potassium cyanide is used in a killing-bottle — a wide-mouthed, tightly stoppered jar with lumps of cyanide in the bottom covered with Plaster of Paris.
- Small and soft-bodied insects like Collembola, thrips, nymphs and larvae are killed and stored in 95% alcohol. Methylated spirits is not satisfactory, causing brittleness and eventual disintegration.

Here students will find more material

- Sampling insects: general techniques, strategies and remarks by Patrick Grootaert Royal Belgian Institute of Natural Sciences (RBINS) Rue Vautier 29, B-1000 Brussels, Belgium.
- https://mississippientomologicalmuseum.org.msstate.edu/collecting.preparation.methods/Collecting.methods.htm