

2.4b Preserving macro specimens

You may wish to preserve your specimens for several reasons, including:

- To have comparison specimens for students to use in future years.
- To save specimens for students who wish to take the classification past the family level for a project, or who wish to learn more about specific macroinvertebrates.
- To do a quality assurance of the student's identification

Figure 1 Macros Preserved in Ethyl Alcohol



Photo Credit: Brenda Perry

Ethyl Alcohol Method

In order to save specimens, use 95% ethyl alcohol and place them in 2-4 dram vials. If you are just planning on saving example specimens, most specimens will fit easily into a 2 dram vial. If you want to save all the specimens for each group, you may wish to have 4 dram vials to contain all the scuds from one location.

When preserving the specimens, be sure to completely cover them in alcohol. For best results, within 24-48 hours, pour off the alcohol and replace it with new alcohol. Don't forget to have students create a label to record when and where the specimen was found. Over many years, the alcohol may dry out so be sure to check on your specimens each year. Some insects like leeches and scuds will discolor due to the alcohol. The image to the left is of 4 dram vials for an idea of size.

Hand Sanitizer Method

Source: Trout Unlimited's Eastern Abandoned Mine Program, available at https://www.patroulintheclassroom.org/docs/default-source/resources/making-preserved-macroinvertebrates.pdf?sfvrsn=bb831777_2.

One of the cheapest and best alternatives for preserving macroinvertebrate specimens is to use hand sanitizer as a medium. This method is relatively inexpensive, and the hand sanitizer not only rehydrates the macros, but also suspends them so they can be observed easily. It takes a bit of work to make the final product look good and last, but once you put in that work, the final product can last a year or more with no maintenance.

Materials

- Alcohol resistant bottle with tight-fitting lid for preservation.
- Preservation Alcohol
 - 80% or higher ethanol, or 90% isopropyl alcohol (rubbing alcohol). Do not use 70% rubbing alcohol, as this will not adequately preserve the macroinvertebrates and they will rot.
- Glass or alcohol-resistant plastic vials
 - Some plastics will cloud when exposed to alcohol, so select vials that can be exposed to alcohol. Be sure the vials have tight-fitting lids, or a way to secure them, so no air reaches the hand sanitizer. (Try using 1 oz. bullet bottles with lid, which can be purchased on the Internet.)
- Hand sanitizer
 - Must be clear. Cheaper brands tend to be thinner, which is useful in removing bubbles, but if you are trying to suspend large or heavy macros, use the thicker name brands.
- Tweezers
- Eye droppers

Figure 2 Hand Sanitizer Method: Final Product



Photo Credit: Eileen Boekestein

Instructions

1. Preserve the macroinvertebrates with the preservation alcohol. (Hand sanitizer does not contain enough alcohol to kill and preserve the macroinvertebrates, and will be used in Step 3).
 - Place the collected macroinvertebrates in alcohol in the preservation jar. It is best to place only the macroinvertebrates (no plant material, rocks or excess water) into the jar. Pour enough alcohol into the jar to cover the macros with about an inch extra.
2. Allow the macroinvertebrates to fully preserve.
 - It is best to allow your macroinvertebrates to stay in the alcohol for at least a week. After the first few days, you should place the macroinvertebrates in fresh alcohol. If you are preserving large organisms such as crayfish, it is recommended that you allow up to three weeks for them to preserve.
3. Rehydrate the macroinvertebrates.
 - Pour some hand sanitizer into a small bottle (you do not need to use your final vials). Place the macros in this sanitizer for 24 hours. The next day, they will be rehydrated and flexible.
4. Make your final product.
 - Pour new hand sanitizer into your final bottles. DO NOT use the pump to dispense the hand sanitizer in as it adds bubbles to the sanitizer. Place your macroinvertebrate into the vial. Try not to introduce bubbles in the sanitizer as you do this step. Some bubbles are inevitable and will be removed later.

- Using tweezers, position the macroinvertebrates as you want them to appear in the final product. If there are large air bubbles, use the eye dropper to remove them. If there are many small bubbles, you will need to heat the hand sanitizer slightly.

Figure 3 Hand Sanitizer Method: Before Boiling



- Place the vials in nearly boiling water for a few minutes. You will see that the small bubbles will become large bubbles that can be removed with an eye dropper. Once this is done, make sure that the vials are over-filled with hand sanitizer and place the lid on the vial. There should be as little air as possible in the final product, as air causes the hand sanitizer to become cloudy.

5. Maintaining your samples. Most samples will last years if properly preserved and maintained.
 - In time the hand sanitizer will start to break down and become thin. The macroinvertebrates will still be preserved and can be reused. Remove the macroinvertebrates and replace the hand sanitizer. Keeping the vial away from intense heat and sunlight helps slow this process.
 - If the sanitizer becomes cloudy, it is generally because it has been exposed to air. The cloudy sanitizer can be removed and replaced. If it seems the cloudiness is coming from macroinvertebrates, it most likely means that they have begun to rot. This sample should be discarded.