

STEP 1

Transport

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After fish samples are obtained, they should be transported in an appropriate way to the laboratory at the university or institute for preparing specimens for reference collection. Therefore, a suitable transportation method should be selected, depending on the conditions. In this section, methods of sample transportation are discussed in detail.

Live fish samples are the best for preparing beautiful specimens. To keep fishes alive, they should be carried in small, water-filled plastic bags, taking care that they are not hurt in any way. For example, if gobies and scorpionfishes are carried in the same plastic bag, the latter may prey on the former; even if the gobies survive predation by the scorpionfishes, their body surface and fin mem-

branes will be frayed and torn.

Although live-fish transportation is the most appropriate way to prepare good specimens, this method exposes the fishes to the risk of being damaged. If live fish samples do not have access to abundant air, the fishes will suffocate and die. When suffocated, most fishes spread open their mouths and gill covers wide. In this condition, accurate measurements like those of standard length of the fishes cannot be obtained, since the open mouths and gill covers rigidify because of rigor mortis and it is difficult to restore them to the normal positions. Data for calculating accurate standard length are the most important in academic researches. Furthermore, if fishes die because of lack of oxygen in room-temperature water (including seawater), their body coloration when fresh cannot be recorded, since the body color fades rapidly and significantly.

Although live-fish transportation is very valuable for preparing beautiful specimens, it should be noted that transportation of some fishes alive, especially freshwater fishes, is legally prohibited. These laws differ among countries, and all laws in a country should be respected while collecting and transporting fish samples.

After successful transportation of live fish samples to the laboratory, the fishes



Some fishes carried in a plastic bag.



Largemouth bass (*Micropterus salmoides*), listed under the Invasive Alien Species Act of Japan.



Bluegill (*Lepomis macrochirus*), listed under the Invasive Alien Species Act of Japan.

should be sacrificed by immersion in ice-cold water or anesthetized.

If sample treatment cannot be initiated immediately after collection (live fishes from sampling sites or dead fishes from places like fish markets), the fishes should be transported in a cold box filled with ice-cold water (seawater for marine fishes and freshwater for freshwater fishes). It should be noted that if fishes are put on ice directly, the color of the body part touching the ice changes. Moreover, ice-cold water is crucial for preserving the freshness of the samples before treatment. Thus, it is better to temporarily keep fish samples in ice-cold water for at least several minutes before initiating treatment.

Freezing is a better method of preserving fish samples than keeping in ice-cold water, if the samples cannot be treated for a long time and/or they need to be



Fresh fishes carried in ice-cold water.



Fish samples temporarily kept in ice-cold water to preserve their freshness.

transported over long distances. However, fishes begin decaying, especially the internal organs, on long-term chilled storage. Fish samples should be stored in a freezer if they cannot be treated within 1–2 days after collection. Methods of freezing fish samples are discussed in STEP 2.

1. Freezing of samples (for preservation and storage) → Step 2

2. Treatment of samples (for specimen preparation) → Step 4