



SAMPLE COLLECTION, PRESERVATION TECHNIQUES

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The Importance of Fish Collections

Fish collections in museums serve a multitude of purposes, ranging from scientific research and education to conservation and public outreach. They provide a tangible record of biodiversity, allowing researchers to study evolutionary patterns, track changes in species distributions, and delve into the intricacies of ecological relationships. Moreover, these collections play a vital role in taxonomic studies, helping to identify and classify new species and refine existing classifications.

Methods of Fish Collection

The process of fish collection begins with careful planning and ethical considerations. Fisheries scientists, ichthyologists, and museum curators often collaborate to design expeditions or obtain specimens through sustainable means such as bycatch from commercial fishing operations or donations from recreational anglers.

1. **Field Collection:** Field expeditions involve a range of techniques depending on the habitat and target species. These may include seine nets, trawls, electrofishing, and hand collection. Each method is tailored to minimize stress on the fish and ensure accurate representation of the local fauna. The major objective of the collection and documentation is to identify all the available species in the habitat using all the gear combinations. Two types of gears are employed can be divided in to two viz, active and passive categories. Passive gear is usually set and left stationary for a period and commonly used gear are gillnet and traps. Active gears used in the inventory are seine nets, trawl nets, dip nets, hooks and line and electric fishing. Different factors affect fish sampling such as water depth, conductivity, water clarity, water temperature, fish size and fish behaviour.
2. **Specimen Preparation:** Once collected, specimens undergo meticulous preparation. Sample specimens of fish species from different ecosystems covering the entire length range are to be collected and preserved in 2% formalin after injecting 5% formalin through the vent and dorsal musculature. The specimens should be preserved in a wide mouthed bottle in such a manner that the shape is not distorted during storage. Common preservation techniques include formalin fixation for wet specimens or ethanol preservation for genetic studies.
3. **Documentation:** Accurate data recording is paramount. Each specimen is tagged with essential information such as location, date of collection, habitat details, and

collector's name. Digital photographs and detailed field notes further enhance the specimen's scientific value.

4. Morphometric and meristic data are generally taken following Hubbs and Lagler (1947). Measuring linear dimensions of whole or parts of fish is probably the most widely used technique in taxonomic studies. Such observations are made with tapes and digital calipers. Measurements are usually but not always taken along straight lines.

Preservation Techniques

Preserving fish specimens for long-term storage involves a blend of traditional methods and modern technologies:

Wet Preservation: Specimens preserved in alcohol (ethanol or isopropanol) or formalin are ideal for maintaining soft tissues and external morphology. However, these methods can cause tissue shrinkage or color distortion over time and hence cause measurement errors.

Skeleton Preparation: For skeletal studies, specimens undergo maceration to remove soft tissues, followed by degreasing and drying. This process yields clean, articulated skeletons suitable for anatomical research.

DNA Preservation: With advances in molecular biology, DNA extraction and preservation have become crucial. Ethanol serves as a preferred medium for DNA storage, ensuring genetic material remains intact for future analyses.

Digital Archiving: In addition to physical specimens, high-resolution digital imaging and 3D scanning techniques are employed to create virtual archives. These digital replicas facilitate global access to fish diversity without compromising specimen integrity.

Labels and Labelling

Labels, giving all essential data, should be placed in the jar with the fishes when collected. Accurate information about the locality is as valuable as the specimens themselves; specimens without proper data are of little scientific value.

1. Labels should have at least the following information: Exact locality, coordinates, date collected, name of the collector, and any other information that seems pertinent, such as depth of water, method of capture any and all ecological data, etc.



2. Labels should be written with a soft lead pencil or permanent black ink (e.g., a Rapidograph pen) on 100% cotton or linen paper. Do not use ordinary paper because it will disintegrate in the liquid. Do not use a ball-point pen—the ink in most cases washes off in a matter of days.
3. Large fishes may be tagged, preferably through the lower jaw, with all essential data written on the tag, or a number may be used and the data recorded under the identical number in a notebook. Always keep a field notebook in which you record all the information about each collection made.

Accession: Museum specimens are all provided with an accession number which is the key to the classification and housing status of the fish

Curating. Specimens in the collection of fishes will be housed in a variety of receptacles, each designed for maximum resistance to environmental factors that would degrade or otherwise reduce the value of the preserved specimens. Small specimens are to be housed in plastic vials with slip caps or glass vials plugged with cotton or polyester fiber. In order to most effectively combat evaporation, such vials are to be stored in large glass jars. Large specimens are to be preserved well and transferred to glass boxes/cylinders to maximise visibility.

What makes a good scientific specimen for collections?

1. Generally a good specimen is one that isn't a duplicate and one that preserves as much of the character of the living specimen as possible.
2. The specimen should also be preserved in a way that allows particular kinds of analysis.
3. Scientific specimens also need reliable information about where and when a specimen was collected.



Preserving color.

Regardless of the preservative, the vibrant colours of fish aren't mostly preserved. Colour of fishes fade in sunlight, so collection rooms are usually windowless. Instead of turning lighter, the fishes in a collection appear to be shelves-upon-

shelves of jars filled with brown fishes in brownish-yellow liquid. Some fishes lose their color long before they arrive at collections

Educational Outreach and Public Engagement

Fish collections in museums transcend scientific research; they serve as powerful tools for education and public engagement. Exhibits showcasing diverse fish species, evolutionary adaptations, and ecological interactions captivate audiences of all ages, fostering a deeper appreciation for aquatic ecosystems and the need for conservation efforts.

In conclusion, fish collection and preservation for museum taxonomy represent a harmonious blend of scientific rigor, artistic skill, and conservation ethos. Through meticulous curation and responsible stewardship, these collections continue to unravel the mysteries of aquatic life, inspire future generations, and contribute to the global pursuit of biodiversity conservation.
