

The role of voucher specimens in mammal collections: characterization and funding responsibilities

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A mammalian voucher specimen is one which serves to physically and permanently document data in an archival report by 1) verifying the identity of the organism(s) used in the study, 2) by so doing, assuring the repeatability of the study which otherwise could not be repeated and/or accurately reviewed or reassessed. Thus, voucher specimens are the sole means to verify the data documented in a report and to make historical comparison possible. Mammalian voucher specimens may be classified in three categories: 1) type specimens; 2) taxonomic support specimens; and 3) biological documentation of specimens. The mammalian collections which house these specimens constitute a vital, non-renewable resource for the people of the world.

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1. Introduction

Mammal collections constitute a vital, non-renewable resource for the people of the world. Traditionally, these collections have been generated from taxonomic studies and other basic (non-applied) research projects. Today, these collections and the data associated with them are growing rapidly from several new sources of specimens including projects directed toward environmental and ecological assessments, biological control activities and various biochemical and genetic studies to mention but a few.

Many of these studies generate, or should generate, voucher specimens. Unfortunately, little attention has been directed toward maximizing the potential of these materials or assessing the impact of their addition to the mammal collections of the world. Many studies are conceived, conducted, and completed without a clear understanding of what a voucher specimen is, how it should be handled or preserved, what accompanying information is required, or how it should be handled once the study is completed. The vast numbers of mammalian voucher specimens currently being collected and those already in repositories, hold the potential of providing a clearer and more accurate analysis of our world and its problems. It is essential that guidelines covering procedures and standards be adopted to prevent wasting this valuable resource and that sufficient funding be made available to insure quality maintenance.

2. Characterization and importance

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The first step in communicating an investigator's results in any report involving any biological entity, including mammals, is identification of the organisms used in the study. Thus, voucher specimens insure that identification of organisms studied can be verified and corrected if necessary even in cases where a study can not or will not be repeated. In addition, they provide critical information for future studies of many kinds. These properties make voucher collections unique, irreplaceable resources which the countries of the world must carefully protect.

● Mammalian voucher specimens can be categorized into three basic types: 1) type specimens, upon which names of taxonomic units are based, 2) taxonomic support specimens; specimens of primary importance in taxonomic studies other than nomenclatural studies, such as range extensions and life-history studies, and 3) biological documentation specimens; representative organisms derived from studies or projects other than primarily taxonomic such as biochemical studies or environmental impact projects.

Biological documentation specimens represent the greatest increase in voucher specimens currently arriving at repositories. Mammalian studies other than primarily taxonomic also represent the major class where proper voucher specimens are often lacking. Voucher specimens are required in any study in which verification of experimental results can be accomplished only through

reassessment or reevaluation of existing data, and where the species involved may not be unequivocally identified without access to sample taken in the original study. Secondly, voucher specimens are required when the nature of the study brings about alteration of specimens such that future re-identification or verification is made impossible and/or when the diversity of taxa under study is so great or the systematics so complex that all species involved probably will not be identified accurately. Finally, voucher specimens are required where taxonomic groups are not yet known accurately to species level.

The physical forms of voucher specimens may range from the whole or part of the actual animal to an associated specimen that is biologically or functionally related, such as, stomach contents, chromosomes, or parasites. Regardless of the physical forms of the voucher specimens, to fulfill their function they must 1) have recognized diagnostic characters that are appropriate to the level of identification in the report, 2) be preserved in good condition by the investigator/collector according to acceptable practice (see Hall 1962), 3) be thoroughly documented with field notes and/or other relevant reports, and 4) be maintained in good condition and be readily accessible in suitable repositories.

3. Cost, fees, and funding responsibilities

Voucher specimen storage is an expensive and complex task. Rising costs associated with world-wide inflation coupled with the ever increasing number of specimens from the types of studies discussed above has made it increasingly difficult for many institutions to store and manage their collections properly. Consequently, these specimens must be of high scientific quality. Furthermore, it is becoming increasingly evident that fees should be charged to accept, process and maintain voucher collections and these costs should be borne by the contracting or funding agencies. Once properly prepared, deposited, and integrated into the main collection, they are of value to the housing institution and to future investigators and thus overhead and indirect costs should be the responsibility of the repository.

There are five major categories of expenses associated with mammalian voucher specimens. The first of these involves the costs of collection and preparation. These costs depend largely upon how specimens are collected and prepared and vary considerably depending upon objectives and magnitude of different projects, type and condition of specimens, level of taxonomic service required and geographic locality of the work. Some of these factors have been discussed comprehensively for various programs such as the one by Leupke (1979) for environmental monitoring. The contractor should be prepared to pay for this service.

The next major category involves accessioning, processing, and identification of voucher specimens. Upon arrival at a collection center or museum, voucher specimens must undergo several routine steps whose sequence may vary from institution to institution.

Anderson (1973) has provided a detailed accounting of these procedures so they will not be discussed in depth here. These fees should also be covered by the funding agency. Once integrated into the main collection, however, the cost of maintenance and management usually is the responsibility of the housing institution. Normally specific voucher identifiers are associated with the specimens for easy retrieval. If voucher collections must be maintained separately from the main collection for an extended period, it may be necessary to assess special fees for maintenance and management.

Finally, once they are part of the main collection, voucher specimens may be used in numerous ways. A specialist or user may wish to visit the museum or collection to use voucher specimens for study, to use specimens for biochemical, karyotypic or other analyses, or obtain information on particular species. Costs for these users are normally borne by the collection if no profit to the user is involved. If the user will receive some direct financial benefit from study of the vouchers, the host organization should be reimbursed for expenses resulting from use of the specimens.

A cost summary of voucher specimens can be estimated by summing costs of the above categories. Thus general estimated costs per specimen = collection + preparation + accessioning + processing + identification + incorporation overhead (maintenance management, and use). Using this formula, the general total cost for a single mammalian voucher specimen based on the average cost in U.S. dollars is approximately \$43.00. This estimate will vary from country to country and from collection to collection and must be continually revised as prices increase. The formula, however, should be applicable to most mammal collections in its present form.

No justification exists for random accumulation of enormous numbers of specimens in national and regional repositories. As shown in the foregoing pages, costs for collecting, processing, and maintaining voucher specimens are considerable. However, the costs of ignoring the importance of representative samples of voucher specimens can be substantial, both monetarily and in terms of information loss. Collection and deposition of vouchers under appropriate conditions should be required by funding and contracting agencies. Furthermore, costs incurred by so doing should be written into all research or contract proposals and these costs should be honored as legitimate costs of research.

References

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