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Wildlife Forensics Morphology Standards



DRAFT DOCUMENT

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Keywords: wildlife forensics, taxonomic identification, reference collections, morphology, animal hair identification, osteology, class characters

Abstract

This document provides minimum standards for wildlife forensic analysts in the subdiscipline of morphology. This document covers good laboratory practices, evidence handling, and training which are central to all forensic laboratories. They also include critical considerations of phylogeny, taxonomy, and reference collections that are specific to wildlife forensic science.

Foreword

Morphology is the study of form. In a wildlife forensic context, it is the discipline using physical comparison to identify wildlife parts and products, typically to the family, genus, or species source. Depending on the nature of the evidence, a variety of macroscopic and microscopic comparison techniques may be employed.

Most analyses performed by a forensic wildlife morphologist are based on class characters, not individual characters. Shared quantitative and/or qualitative morphological characteristics are used by scientists to specify, or define, taxonomic groups, such as families, genera, and species. Such class characters can be reliably associated with evolutionary lineages down to the species level. Individualization, in contrast, requires the recognition of characters uniquely identifying a particular individual. Individualization based on morphological characters is rarely attempted in wildlife cases.

The method of morphological comparison is the basis for classic studies of biological structure and evolution, and is essential in the scientific work of taxonomists, anatomists, paleontologists, and archaeologists, as well as forensic anthropologists. An extensive body of peer-reviewed literature exists that establishes the scientific rigor and utility of morphological comparison techniques.

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Wildlife Forensics Morphology Standards

1 Scope

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Morphology is the study of form. In a wildlife forensic context, it is the discipline using physical comparison to identify wildlife parts and products, typically to the family, genus, or species source. Depending on the nature of the evidence, a variety of macroscopic and microscopic comparison techniques may be employed.

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2 Normative References

The following referenced documents are indispensable for the application of this document.

Organization for Scientific Area Committees, Wildlife Forensics Subcommittee, Wildlife Forensics General Standards. Currently under review by the AAFS Standards Board (ASB).

3 Terms and Definitions

Terms relevant to this document are defined in the BioTerms Glossary.

4 Standards

4.1 General

- 4.1.1 The analyst shall examine, interpret, and document morphological similarities between the evidence item and specimens of known species source, using additional information from scientific references, as appropriate.

- 4.1.2** Instruments required for morphological measurements shall be subject to calibrations as recommended by the manufacturer.
- 4.1.3** The analyst shall consider the diagnostic value and inter- and intraspecific variability of the characters being analyzed.
- 4.1.4** Scientific references used in morphological examinations shall be cited.

EXAMPLE Primary scientific literature, taxonomic monographs, morphometric datasets, dichotomous keys, field guides, and scientifically accurate (curated) image databases.

- 4.1.5** The most relevant reference specimens shall be selected with consideration of, as appropriate:

- a) life history stage,
- b) sex,
- c) geographical origin.

- 4.1.6** In making a taxonomic identification based on morphological characters, the analyst shall document the following in the bench notes:

- a) type of material received as evidence,

EXAMPLE Whole or partial organism, bone, tooth, feather, hair, ivory carving, leather, crafted item.

- b) intactness and condition of the evidence,
- c) morphological characters used to make the taxonomic identification,
- d) reference materials and/or data sources used to verify taxonomic identification.

- 4.1.7** Bench notes and data interpretation shall follow the hierarchy of taxonomy, with characteristics of the order noted first, followed by family-specific characters, and finally those diagnostic to particular genera and species.

4.2 Process of Morphological Examination – External Remains

- 4.2.1** The analyst shall consider the completeness and condition of the evidence, and the presence or absence of taxonomically informative characters to determine the appropriate taxonomic level to which identification can be made.

4.3 Process of Morphological Examination – Osteological Remains

- 4.3.1** Skeletonization shall not be undertaken without consulting the submitting agent/officer.

- 4.3.2** Evidence documentation shall include a description of the osteological elements examined, their physical condition, and any taphonomic or anthropogenic alterations.
- 4.3.3** If sufficient material is available, the analyst shall determine life history stage, such as adult, subadult, juvenile, or neonate, by evaluating age-informative characters for the taxon in question.

EXAMPLE Epiphyseal fusion of skeletal elements or relative completeness of dental eruption or wear in mammals.

4.4 Process of Morphological Examination – Microscopic Structures

- 4.4.1** Detailed examination of integumentary structures, such as hair and feathers, shall begin with documentation of gross features such as color, pattern, size, length or shape.
- 4.4.2** Microscopic examinations used to document details of external and/or internal structures and/or cross-sectional profiles.
- 4.4.3** Identifications shall be made based upon taxon-appropriate characters with reference to collections of specimens of known taxonomic source, such as mounted hairs or feather barbs, or, to scientific references as defined in 4.1.4, above.

Bibliography

The references listed here include the key materials upon which these standards are based, and some additional references for context or specific issues covered. This is not intended to be an exhaustive list of relevant literature.

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