

Handling Live Amphibians

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Philosophy

In order to gather data on amphibians, it is often necessary to handle live individuals and sometimes to preserve them. Here, we provide guidelines for proper handling of live specimens; our aim is to describe an attitude of treatment, rather than to provide exhaustive coverage of methods of amphibian care. In all instances, live amphibians should be treated with care and respect.

Specific guidelines for the use of live amphibians in field research have been promulgated jointly by three herpetological societies (see Committee 1987). The Scientists' Center for Animal Welfare has also published guidelines for field research, with a discussion of their impact on institutional committees on animal care and use (Orlans 1988). Humane treatment of amphibians to be prepared as voucher specimens is reviewed in Appendix 4.

Handling

Amphibians should be captured carefully. In particular, contact with the tails of salamanders should be avoided because the tails break off easily when handled. Tail loss may have a significant effect on survivorship, reproduction, and dominance interactions with conspecifics.

Amphibians dry rapidly during handling, especially if they struggle. When an animal begins to dry, 5 to 10 ml of water should be poured over it. If the animal is held in cupped hands with water for a minute or so, it can absorb moisture more easily. Amphibians should be maintained in captivity as briefly as possible and under conditions that match their natural habitat as closely as possible.

If surgical procedures (e.g., toe clipping) are used, all equipment must be sterilized before moving from one collecting site to the next. This practice will pre-

vent the inadvertent introduction of disease from one amphibian population to another.

Anesthesia

Some techniques (e.g., those involving surgery) require that amphibians be anesthetized. Amphibians are species-specific in their response to anesthetic chemicals; no single anesthetic is effective for all amphibians. A solution of 30% ethyl alcohol in water should be the first anesthetic agent tried, because of its wide availability and its effectiveness for many species. The amphibian is carefully placed in the solution. It is anesthetized as soon as it is completely flaccid when held or does not respond when nudged with a blunt probe.

Other anesthetic agents that have been used successfully include a solution of equal parts of saturated benzocaine solution and water; MS 222, or tricaine methanesulfonate (ethyl M-aminobenzoate methanesulfonate) in aqueous solution ranging from 0.03% to 0.05%; and an aqueous solution of chlorobutanol (often referred to as Chloretone; for information on solution preparation, see "Procedures for Killing" in Appendix 4). All anesthetic solutions should be at pH 7.0 to avoid damage to the skin of sensitive species; this is particularly critical with MS 222.

Measurement

Body length, or snout-vent length (SVL), can be measured with a ruler fitted with a right-angle stop at one end, or, in the case of salamanders, a measuring tube can be used (Fellers et al. 1988). SVL is measured from the tip of the snout to the opening of the vent. When a ruler is used, it is best viewed from the side, as the frog or salamander is held against the ruler with its snout touching the stop. (Metal rulers with stops can be purchased from some bird-banding suppliers; see Appendix 6.) The animal's head, neck, and body should follow a straight line and be relaxed. The amphibian vertebral column is somewhat flexible. Therefore, it is important that one not try to straighten the animal by pulling hard on its body. Doing so stretches the animal and may harm it, and may result in inaccurate measurement.

Frogs, caecilians, and salamanders may be weighed in plastic bags of an appropriate size. After the animal is in a bag, the top should be folded over two or three times to reduce the space in which the animal can move and to decrease the surface area against which the wind can blow. The bag and animal are weighed with a spring balance, and the weight of the bag subtracted. On windy days the bag can be suspended in, but should not touch the sides of a jar.