ZOO HELP* *from AZA***

ZOO STANDARDS FOR KEEPING INSECTIVORES IN CAPTIVITY

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INTRODUCTION

The Order Insectivora (including the Order Macroscelidae) contains eight families and consists of approximately 63 genera and 300 species. This group consists of fossorial, semi-aquatic and terrestrial animals. Most are nocturnal and all are either solitary or monogamous. This group contains some of the world's smallest mammals, and includes the American Pygmy Shrew, *Microsorex hogi*, and Pygmy White-toothed shrew, *Suncus etruscus*.

The majority of insectivores have high metabolic rates and are short-lived. In addition, undue handling may cause death from stress, thus further creating problems in their captive management. Because of their nocturnal or fossorial life styles and solitary behavior, many members of this Order are not routinely kept.

In addition to basic husbandry challenges, breeding success in most species has been limited. Only elephant shrews, Macroscelidea; tenrecs, Tenrecidae; and shrews, Soricidae, have been bred repeatedly.

Husbandry - Due to the relatively small size of most insectivores, many species can be successfully maintained in small laboratory cages or aquaria. Aquaria are probably the best housing for the majority of insectivores; five gallon units may be used for shrews and 55 gallon sizes are adequate for keeping elephant shrews and tenrecs.

Some species of insectivores can be maintained in pairs, including elephant shrews, *Elephantulus;* hedgehog tenrecs, *Setifer* and *Echinops sp.;* and streaked tenrecs, *Hemicentetes sp*. Some elephant shrews are social and live in small colonies, as the short-tailed shrew, *Cryptotis parva*.

GENERAL HUSBANDRY

Temperature - Insectivores are found in tropical and temperate climates and should be maintained at temperatures ranging from 74 - 82 degrees F (23 - 28°C). Some species of tenrecs and hedgehogs reduce their activity levels dramatically during winter months, and regardless of temperature. All species should be kept free of drafts and abrupt temperature changes of more than +/- 5 degrees.

Lighting - Since the majority of the insectivores are nocturnal and/or fossorial, normal light levels are acceptable. Reverse light schedules does not usually increase their activity levels.

Florescent lighting is best; incandescent, mercury vapor or halide lights are acceptable.

Ventilation and humidity - Because of their small size, the need for flow-through ventilation is not critical. Ventilation in aquaria or small animal holding cages having wire mesh tops (aquaria) or fronts (cages) should be satisfactory. Drafts should be avoided in either arrangement.

Humidity is especially critical in fossorial species such as moles. If natural soil substrates are used, care must be taken to keep the soil moist but not wet. In other species, humidity levels should be maintained at 30 - 45%. Aquatic insectivores need to have dry, well-ventilated areas for resting and nesting. These sites need to be draft free.

Water - Water should be available free choice. Drinking water in separate containers should also be provided for aquatic species so that they are not forced to swim, eliminate, drink and eat in the same water.

Water containers should be small and low enough to allow easy access but not so deep as to prevent easy escape. Glazed clay crocks are probably best, with a large rock added to allow escape from drowning.

Sanitation - Because of their small size, most insectivores produce little fecal material. Many species spot defecate; some of the larger species (moon rats) defecate in water, making cleaning easy.

** This column consists of short articles and notes which have been assembled for a larger zoo audience. Some of these pieces will be from zoo associations in other parts of the world and may contain some inappropriate, impossible or unworkable suggestions with regard to procurement of food, climatic factors, economics, etc. We will do our best to eliminate material that is in serious conflict with the conditions in India and with norms and standards of CZA. This material is meant to be supplemental, not contrary or seditious. This column is to insure that something useful to zoological parks and gardens or captive breeding centres appears in ZOOS' PRINT every issue.*

*** AZA stands for the American Association of Zoos, which is the largest association of zoo professionals in the world and one of the most active. The AZA Minimum Standards were prepared at the request of the US Department of Agriculture, which is the nearest equivalent to the Ministry of Environment and Central Zoo Authority in USA, as a way for their inspectors to better evaluate zoos, dealers, road-side facilities and anyone else requiring a legal permit. They asked for primate standards in the mid-1980's, and all others about 1990. Dr. Alan Shoemaker, Curator, Riverbanks Zoo, Columbia, South Carolina, oversaw the project from the early 1990's until completion in 1997 when the printed version was distributed to all AZA zoos. The standards are minimal in many respects, but optimal in others. While it may be safe to say they were developed for temperate zoos, contributing zoos such as San Diego, Brownsville (Texas) and Miami are not at all temperate so there may be little conflict climatically.*

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Substrates, whether natural or artificial, should be changed no more than once a week. Spot defecators employ a toilet area that should be cleaned daily as should bowls of those species that defecate in water.

Water containers of aquatic species should be drained and cleaned daily using **dechlorinated** water only.

All soil enclosures should be cleaned and disinfected monthly. With fossorial species, care should be taken to ease the stress of abrupt soil changes. Use of a second aquarium with soil set-up will often minimize upset.

Diet - Most insectivores require very specialized diets. Depending upon the species, live food such as earthworms, mealworms, crickets and crayfish may be needed. More specialized species (moon rats, otter shrews, water tenrecs and Desmans) eat crabs and live fish. Food intake should be monitored with care. Many terrestrial species will accept insects, ground meat, fruits, and vegetables; fossorial species will eat insects and meat. All invertebrate food should be fed alive.

Because of their rapid metabolic rates, food should be provided in adequate amounts on a daily basis, especially for aquatic and fossorial species. Except in terrestrial species which tend to become obese if their diet is not carefully monitored, overfeeding is not a problem. Vitamins and other additives are seldom required.

Veterinary care - Services of a veterinarian experienced with small mammals should be available. Fecal examinations should be made at least once a year for parasite infestation and treated appropriately. No vaccinations are recommended; isoflorane anesthesia can be used to facilitate examination.

Once ill or injured, most aquatic and fossorial species do not survive; additional treatment and handling may accelerate death through stress. Larger species such as tenrecs, hedgehogs, and moonrats may be successfully treated for injuries and illness. Hedgehogs in particular are susceptible to mange. Mite and tick infestation can be treated by dusting with cat flea powder. The life span of shrews and moles rarely exceeds 36 months and most newly caught specimens, already mature at the time of capture, seldom live more than 18 - 24 months.

Individual identification of insectivores is difficult, and toe clipping is the preferred means of identification because it is quick and free from stress. Larger species such as moon rats and tenrecs can be tattooed; hedgehogs may be marked with finger nail polish. Transponder chips may become feasible for fossorial species because animals can be identified without disturbing the nest area although stress from transponder insertion may be a problem.

SPECIAL REQUIREMENTS

Insectivores can be divided into four basic groups: small terrestrial, small fossorial, aquatic and large terrestrial, and each group possesses its own unique management requirements. Small terrestrial species can be maintained in aquariums or similar caging that ranges in size from 5-gallon up to 55-gallon sizes. Suitable substrates include newspaper, wood shavings, soil, peat mulch, leaves or commercial cat litter.

Fossorial species can also be maintained in aquaria or similar caging but should be provided with natural substrates such as soil, mulch or leaves in which to burrow. The substrate should be kept moist but not wet.

Grzimek (1972) states that moles cannot be kept on solid bottomed cages or tanks because of fecal accumulation and a resultant toxicity. Others report no such problem when keeping star-nosed moles, *Condylura cristata,* and Eastern American moles, *Scalopus sp.* over a period of many years (Xanten, pers. obs.). In those instances, replacing enclosure soil on a monthly basis has been adequate.

Aquatic species are probably the most difficult species to maintain. Desmans have been kept for short periods, and star-nosed moles have been maintained for up to 24 months. Most other aquatic species have only been maintained in rare instances.

All aquatic species must be kept in water free of chlorine. Star-nosed moles require chilled water; if possible, the water should be moving. Little else is known about keeping most aquatic insectivores in captivity and little information is present in literature.

LITERATURE CITED

Grzimek, B. 1972. GRZIMEK'S ANIMAL LIFE ENCYCLOPEDIA, Vol. 1. MAMMALS. Von Nostrand, NY.

Nowak, R. and J. Paradiso 1983. MAMMALS OF THE WORLD, 3rd EDITION. The Johns Hopkins University Press, Baltimore.