

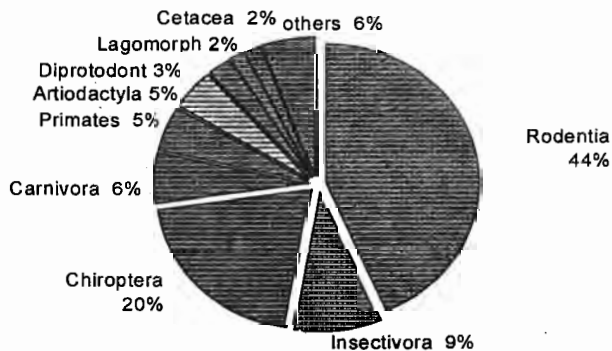
The Potential for Exhibition and Interpretation of Small Mammal Displays*

Mike Jordan**

Introduction

The exhibition of Rodents and Insectivores has traditionally played a minor role in most zoological collections with the popularity of carnivores, primates and ungulates having dominated the mammal species retained by almost all animal collections. Yet the orders of Rodentia and Insectivora combined comprise a massive number of mammalian species. There are 2021 species of Rodents (43.7% of all mammals, Wilson & Reeder 1993) and a further 428 species of Insectivores. Thus over 50% of all mammals are members of these two orders (Figure 1). It should be noted of course that in fact the Chiroptera are the second largest individual order of mammals (Figure 1), representing 20% of all mammal species. Whilst much of the ecological and conservation information concerning Rodents and Insectivores within this paper could also be applied to the Chiroptera, their very specific housing and husbandry requirements are not so readily catered for. This means that unfortunately they are excluded from this discussion on the incorporation of small mammals into existing collections.

Figure 1.
Mammalian species of the World
(Total species = 4629)



Whilst it is evident that in the affections of many members of the public the appeal of a gerbil or hamster species may never replace that felt for a Tiger or Gorilla, nevertheless the massive diversity within the two orders does mean that many species make excellent focal displays in their own right. Many species of squirrel rival the small primates with respect to colour and activity, and displayed well can make superb exhibits. However, the potential of Rodents and Insectivores for education, conservation and research remains largely unexplored by most zoological collections.

The Educational potential

Almost regardless of the concept one wishes to convey there are Rodents or Insectivores that are suitable examples. As they comprise over 50% of all mammal species their global distribution is expansive. Rodents occur in all of the six zoogeographical regions of the world (Figure 2) in addition to

a large number of island endemics. Insectivores are present in five of the six zoogeographic regions (Figure 2), but are absent from the Australasian region. Very few species of Insectivore occur within the Neotropical region since in both regions their ecological niche is largely fulfilled by small Marsupials. The Rodents and Insectivores represent a high proportion of mammalian biodiversity within all regions (Figure 3).

Figure 2

The number of species of Rodents and Insectivores within each of the six Zoogeographic regions (from Corbet & Hill 1991)

Mammalian Order		
Number of species occurring within Zoogeographic regions		
Region	Rodents	Insectivores
Palearctic	239	66
Nearctic	200	48
Afrotropical	265	155
Neotropical	450	10
Indomalayan	304	52
Australasian	115	-

Figure 3

Percentage of mammalian biodiversity represented by Rodents and Insectivores within each of the six Zoogeographic regions (from Corbet & Hill 1991)

Mammalian Order		
% of mammalian biodiversity within the Zoogeographic Region		
Region	Rodents	Insectivores
Palearctic	50.3	13.9
Nearctic	56.2	13.5
Afrotropical	30.5	17.9
Neotropical	48.0	1.1
Indomalayan	38.4	6.6
Australasian	26.1	-

Such a large number of species occurring across such diverse habitats inevitably occupy a massive variety of ecological niches (Figure 4), from ubiquitous commensal species such as Western House Mouse (*Mus domesticus*) to spectacular tropical arboreal species such as Prevost's

* This paper was reprinted from *Conservation Centres for the New Millennium: Proceedings of the 5th International Symposium on Zoo Design* ed. A.B. Plowman: P.M.C. Stevens, Whitley Wildlife Conservation Trust, Paignton, UK, 1999.

** Animal Management Section, Sparsholt College Hampshire Sparsholt, Hants. SO21 2NF, England. e-mail: mjordan@sparsholt.ac.uk

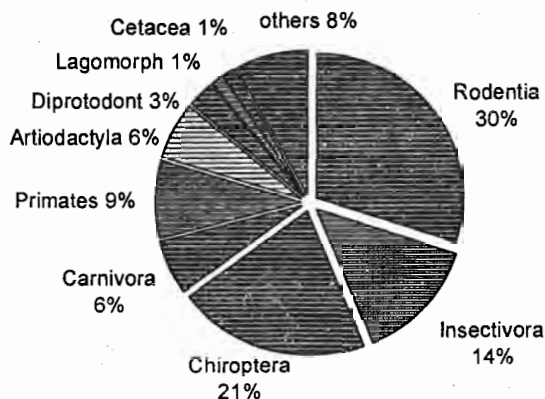
Squirrel (*Callosciurus prevosti*). Examples from the diversity of niches occupied by Rodents and Insectivores across the zoogeographic regions is given in Figure 4. The general lack of arboreal Insectivores is particularly interesting and this niche is occupied by a variety of other mammalian orders. In some zoogeographic regions specialist orders fulfill this role such as the Scandentia (Tree Shrews) in the Indomalayan Region. A range of small Primates also occupy this niche as do foliage gleaning bats. In habit Rodents and Insectivores are incredibly diverse and species exist that occupy almost all habitats and represent a wide array of ecological specialisations, with a wider geographical distribution than any other mammalian groups.

For displays focusing on the plight of specific regions or habitats there are always small mammal species that can be displayed and interpreted to reinforce the message of the uniqueness or fragility of an area. This is particularly true of collections that specialise in their own native fauna (wherever in the world they are situated). It is important that people understand the relatively large role that smaller species play within our environment.

The Conservation role

There often exists a misconception that small mammals are somehow more tolerant or less susceptible to the processes that threaten larger more charismatic mammals with extinction. This is erroneous. There are more Rodent species currently categorised as threatened by the IUCN than for any other mammalian order, with a total of 330 species being classed as threatened (with 16 threatened species within one genus of gerbils (*Gerbillus*) alone (IUCN 1996). Within the Insectivores there are 152 threatened species (Figure 5), including 66 species among the White-toothed Shrews (*Crocidura* spp.) alone. This is more threatened species within this one genus than for the entire order Carnivora!

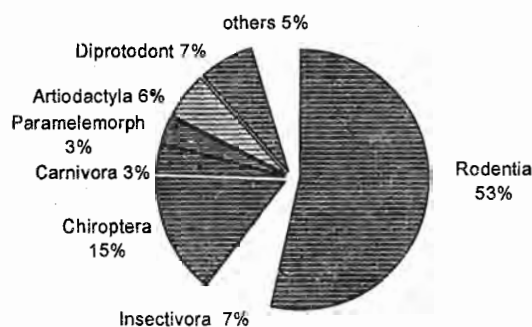
Figure 5.
IUCN Threatened species of Mammal (1996)
(Total species = 1096)



Fifty-three percent of all recent mammalian extinctions have

been of Rodents and a further seven percent have been insectivores (Figure 6). Many species and subspecies are very restricted in distribution with many endemic taxa, leaving them particularly vulnerable to natural disaster or habitat loss. In addition to the large number of species which are globally threatened many more species are of conservation interest nationally or regionally, which is reflected in the IUCN Lower Risk: near threatened category (IUCN 1996) or within national red data books.

Figure 6.
Mammal species IUCN categorised as extinct (1996)
excluding 'extinct in the wild' species
(Total species = 86)



However, in many cases the normally high reproductive rate of Rodents and Insectivores makes them prime candidates for successful captive propagation and management. The generally small size and fairly modest captive requirements of most species mean that viable captive breeding programmes can be realistically managed within modest facilities and budgets. Large viable populations can be produced and maintained within a single establishment, or a small collaboration.

The Research need

Whilst some small mammals, such as the Brown Rat (*Rattus norvegicus*) are clearly amongst the most researched of all mammal species, our knowledge of most Rodents and Insectivores remains exceedingly poor. There is still a wealth of valuable research to be carried out, much of which can be conducted on Rodents and Insectivores within the captive environment.

The taxonomy of many groups, such as the African Dormice (*Graphiurus*) and Spiny Mice (*Acomys*) are still poorly understood and captive breeding and behavioural research can be immensely valuable in clarifying the status of populations and recognising species-specific barriers. Even basic biological information such as reproductive cycles, litter sizes, age of weaning, etc. is often uncertain or remains unpublished for a large number of species. Research of this sort is achievable relatively easily and every effort should be made by collections to record and publish this sort of information.

Figure 4
Examples of the diversity of ecological niches occupied by Rodents and Insectivores
across the six Zoogeographical Regions

Zoogeographical Region	Genera Inhabiting Ecological Niche (Rodents / Insectivores)			
	Aquatic	Fossorial	Terrestrial	Arboreal
Palearctic	<i>Arvicola</i> <i>Neomys</i>	<i>Spalax</i> <i>Talpa</i>	<i>Apodemus</i> <i>Sorex</i>	<i>Sciurus</i> <i>Dryomys</i>
Nearctic	<i>Ondatra</i> <i>Condylura</i>	<i>Geomys</i> <i>Scalopus</i>	<i>Peromyscus</i> <i>Sorex</i>	<i>Sciurus</i> <i>Glaucomys</i>
Afrotropical	<i>Pelomys</i> <i>Potamogale</i>	<i>Cryptomys</i> <i>Chrysospalax</i>	<i>Lemniscomys</i> <i>Crocidura</i>	<i>Graphiurus</i> <i>Echinops</i>
Neotropical	<i>Myocastor</i> <i>Ichthyomys</i>	<i>Spalacopus</i> <i>Ctenomys</i>	<i>Octodon</i> <i>Cryptotis</i>	<i>Echimys</i> <i>Microsciurus</i>
Indomalayan	<i>Nesokia</i> <i>Chimarrogale</i>	<i>Myospalax</i> <i>Parascaptor</i>	<i>Rattus</i> <i>Crocidura</i>	<i>Callosciurus</i> <i>Chiropodomys</i>
Australasian	<i>Hydromys</i>	<i>Pseudomys</i> (Part only)	<i>Notomys</i>	<i>Mesembriomys</i>

Incorporating small mammals into collections

The husbandry requirements of many species are very modest and so it can be relatively easy and cost effective to accommodate and appropriately interpret a number of displays across different areas of a collection. Small mammals can represent either a key display in their own right or be exhibited as reinforcement for other displays of larger species to emphasise particular educational themes or concepts.

The relatively high basal metabolic rates of most small mammals mean that their levels of activity are high, especially amongst the smaller insectivores. Many shrews (Soricidae) eat between 50%-125% of their body weight each day. Manipulating the food intake of these tiny carnivores can result in periodic activity throughout the day and give the public an insight into predatory behaviour that would be impossible to illustrate with larger species. Similarly the display potential of most Rodents can be improved by manipulating the foraging within enclosures, increasing the amount of time spent active and the regions of cages in which most activity occurs.

The real untapped potential though lies in the use of small mammals to complement exhibits of other species. Often nowadays the underlying principle of exhibiting is to convey a message, be it conservation or educational, and yet this message often relies upon the display and interpretation of only one or two relevant large species. Small mammals can be utilised with tremendous impact to occupy the otherwise unutilised areas or so called 'dead' space surrounding these

exhibits, particularly within the indoor areas so often associated with Carnivore, Primate or ungulate houses. The diversity and quantity of Rodents and Insectivores means that with careful species selection almost any message can be reinforced and amplified by appropriate small mammal displays.

As increasingly high standards are expected of zoological collections today and in the future our utilisation of species of Rodent and Insectivore for display should increase. The massive numbers of species and diversity represent very many opportunities for first class display and interpretation, whilst at the same time making a real contribution to conservation and research of many highly threatened and poorly known species.

References

- Corbet, G.B., & Hill, J.E. (1991). *A World list of Mammalian species*. Third edition. British Museum (Natural History) publications. London. 243pp.
- IUCN. (1996). *1996 IUCN Red List of Threatened Animals*. IUCN. Gland, Switzerland
- Wilson, D.E., & Reeder, D.M. (1993). *Mammal Species of the World, A Taxonomic and Geographic Reference*. Smithsonian Institution Press. Washington. 1206pp.