### Suncus murinus

**System:** Terrestrial

<table>
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<tr>
<th>Kingdom</th>
<th>Phylum</th>
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<tr>
<td>Animalia</td>
<td>Chordata</td>
<td>Mammalia</td>
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**Common name:**
- brown musk shrew (English), Moschusspitzmaus (German), Ceylon highland shrew (English, Sri Lanka), Indian musk shrew (English), Ryukyu musk shrew (English, Japan), Asian musk shrew (English), Asian house shrew (English), rat musquee (Mauritian Creole), Kandyan shrew (English, Sri Lanka), kirukanjia (Swahili), Indian grey musk-rat (English, Sri Lanka), house shrew (English), common Indian musk-shrew (English, Sri Lanka), grey musk shrew (English, India), money shrew (English, China), white-tailed shrew (English, Bangladesh)
Synonym

Suncus albicauda
Suncus albinus
Suncus andersoni
Suncus auriculata
Suncus beddomei
Suncus blanfordi
Suncus blythii
Suncus caerulaeus
Suncus caerulescens
Suncus caeruleus
Suncus celebensis
Suncus ceylanica
Suncus chissicaudus
Suncus duvernayi
Suncus edwardsiana
Suncus fulvicinerea
Suncus fusipes
Suncus geoffroyi
Suncus giganteus
Suncus griffithii
Suncus heterodon
Suncus indicus
Suncus kandianus
Suncus krooni
Suncus Kuekenthali
Suncus leucera
Suncus luzoniensis
Suncus malabaricus
Suncus mauritiana
Suncus media
Suncus melanodon
Suncus microtis
Suncus muschata
Suncus myosurus
Suncus nemorivagus
Suncus nitidifolia
Suncus occidentalis
Suncus palawanensis
Suncus palaniana
Suncus pilonides
Suncus riukiuana
Suncus rubicunda
Suncus saoer
Suncus saturator
Suncus semmelincki
Suncus semmelizki
Suncus serpentinarius
Suncus sintensis
Suncus soccatus
Suncus sonnerati
Suncus swinhoei
Suncus terminokii
Suncus tytleri
Suncus unicolor
Suncus viridescens
Suncus waldemarii

Similar species

Summary

Suncus murinus (the Indian musk shrew) is a commensal and adaptable mammal. It is a rapid coloniser and threatens many plant and animal species through predation and competition. Through human agency it has a large and expanding range and, to date, very little work has been done on how to effectively manage the species.
Species Description
A highly variable species, the Indian musk shrew (*Suncus murinus*) varies widely in colour, size and weight. It is small, secretive and mouse-like with a long pointed nose. The fur is short and velvety, ranging in colour from light grey-brown to black and recorded adult weights vary between 23.5g to 82.0g in females and 33.2g to 147.3g in males (Ruedi *et al.*, 1996). The head-to-body length of *S. murinus* is up to 15cm, the tail length up to 8cm (Baker, 2005). A study comparing shrew populations from Guam and Madagascar showed some significant differences in appearance, body weight and length, with female shrews from Madagascar being heavier than females from Guam (Hasler *et al.* 1977). Chang *et al.* (1999a,b) found that the average weight of adult females in Taiwan was 37.4g, and the average weight of juvenile females was 23.2g, while the average weight of adult males was 58.6g, and the average weight of juvenile males was 32.9g. Musk shrews have very small eyes, thick, relatively hairless tails and make frequent shrill high pitched squeaks. The musk glands on its flanks give it a distinctive smell (BBC, 2006). Olsen (1984) outlines a method of distinguishing the fecal pellets of shrews from those of other commensal rodents.

Lifecycle Stages
Gestation period of around 30 days, weaned at 15-20 days (Hasler *et al.*, 1977; Gill & Rissman, 1997). Lifespan in captivity ranges from 1.5 to 2.5 or 3 years (Dryden, 1969; E. Rissman, pers. comm.), with one individual living 3.2 years (AnAge, undated).

Uses
The Indian musk shrew (*Suncus murinus*) may have been deliberately introduced to some areas in an attempt to keep away rats and snakes (Prater, 1947; Murray, 1884; in Taber *et al.*, 1967). *S. murinus* has been successfully domesticated for use as a laboratory animal in the USA and Japan (Tsuji *et al.*, 1999).

Habitat Description
The Indian musk shrew (*Suncus murinus*) is a robust and highly adaptable species. It has a lower metabolic rate than European shrews and is therefore less susceptible to environmental stress. It is found on many islands, in forests or in agricultural land. It is particularly associated with human activity, and this has undoubtedly assisted its geographic spread. The species poses a growing threat as humans continue to facilitate its range expansion. Yang and Zhuge (1989) found that the home range size averaged 1227m² for male shrews, and 241m² for females. In Guam, *S. murinus* nests can be found in open, grassy areas, and beneath or beside large rocks, logs, brush piles and similar materials (Peterson, 1956).
Reproduction
The Indian musk shrew (*Suncus murinus*) has no behavioural oestrus cycle and follicular
development and ovulation are both induced by mating (Gill & Rissman, 1997). The family
Soricidae have retained a number of primitive features including a cloaca and internal male testes
(Churchfield, 1990), which makes distinguishing the sexes difficult in some cases.
Average litter size varies geographically with recorded values ranging from 2.1 to 4.7 correlated
with female body weight, and number of offspring per litter varies between 1 and 8 (Hasler et al.,
1977; Nowak et al., 1983). Females reach sexual maturity at around 35 days (Hasler et al., 1977;
Gill & Rissman, 1997). Breeding takes place throughout the year, with females usually bearing
two litters per year (BBC, 2006). Chang et al. (1999b) reported that the house shrew in Taiwan is
a continuous breeder, with greater activity and intensity occurring in spring and summer. A
comparison between breeding populations from Guam and Madagascar showed some significant
differences. Shrews from Madagascar had larger litters (average 2.8 young per litter) and shorter
gestation periods (29.6 days) than shrews from Guam (2.1 young per litter, gestation 30.3 days).
There were also a number of behavioural differences apparent (Hasler et al., 1977). A study on
shrews in Guam found that food availability was the primary cue for reproduction in males, with
social and photoperiod signals playing a modulatory role (Wayne and Rissman, 1990).

Nutrition
Although nominally an insectivore, the Indian musk shrew (*Suncus murinus*) is an opportunistic
feeder and in some areas feeds predominantly on plant material (Advani and Rana, 1981). It also
eats a wide range of invertebrates, and shrews on Mauritius showed a preference for snails
during bait trial experiments (Varnham et al., 2002). A Bangladeshi study found that the diet of *S.
murinus* was composed of 62% animal food (mostly insects), 29% plant food and 9% miscellaneous food items (Sarker and Parveen, 1986). Laboratory research has shown that *S.
murinus* will eat bread, cake, pastry, jellies, peanut butter, boiled rice, boiled potato, boiled egg,
and a wide range of insect species (Peterson, 1956). Taber et al. (1967) report that *S. murinus*
can be easily attracted with peanut butter. *S. murinus* exhibits a definite preference for protein-rich
materials in India, with food intake per gram body weight being higher in females than males.
Feeding peaks at predawn hours, with a minimum occurring in the afternoon (Balakrishnan and
Alexander, 1979b). *S. murinus* are generally solitary and have a high metabolic rate necessitating
frequent feeding. Prey is killed by a characteristic neck bite, and the death-shake is seen when *S.
murinus* feed on earthworms or rats. *S. murinus* have also been observed hoarding food when a
large number of insects was offered (Balakrishnan and Alexander, 1979a).

General Impacts
The Indian musk shrew (*Suncus murinus*) can reach high densities and impact upon a wide range
of other species, including plants, invertebrates and vertebrates, either through predation or
competition. *S. murinus* is strongly implicated in the extirpation of several island lizard species
(Jones 1993, Rodda & Fritts 1992, Fritts & Rodda 1998). It can damage seeds and young plants
by digging for food (pers. obs.). *S. murinus* can also act as a reservoir for the plague (Duplantier
et al., 2005).
Management Info
There has been little research into the control of the Indian musk shrew (Suncus murinus) and more research is urgently needed, especially in regard to potential poisons. Very little management work has so far been attempted with this species. Limited studies show this species to be relatively unsusceptible to brodifacoum and 1080 (Morris & Morris, 1991; Bell & Bell, 1996), though it is readily live trapped.

Preventative measures: Rodent-proof structures can exclude shrews (Schmidt, 1994).
Cultural: Mowing around structures may decrease preferred habitat and food for shrews (Schmidt, 1994).
Physical: Shrews can be trapped using mouse traps (snap traps), a small box trap, or pit traps. Pit traps are more useful in assessing the presence or absence of shrews in a particular location, as snap trapping appears to understate the abundance of shrews. Traps can be baited with a mixture of peanut butter and rolled oats. A small amount of bacon grease or hamburger may increase the attractiveness of the bait (Schmidt, 1994). Lee (1997) reported that aluminium live traps caught significantly more S. murinus than Japanese plastic snap traps. Live trapping has been used to successfully eradicate the musk shrew from a two hectare island in Mauritius, although a similar attempt failed on the neighbouring island of Ile aux Aigrettes (25 ha) (Varnham et al. 2002). A study by Seymour and colleagues (2005) suggests that the best hypotheses to explain the failure of the campaign was probably the survival of trap-shy shrews. It is observed that shrews target very specific prey, and are not attracted to conventional rodent baits; standard traps rarely work for shrews (B. Coblentz, pers. comm., 2003). Pitfall traps are often favoured for catching shrews (F.W. Schueler, pers. comm., 2003). As they nest under rocks and logs, grids of boards or other flat objects might be placed (and then uncovered periodically) to entice shrews. It may be possible to use dogs to track down survivors of trapping programmes. On Saipan (where shrews often raid pet bowls) snake traps baited with dog or cat food are used. The snake trap is a modified minnow trap with a flap over each door. The local boonie dogs are accustomed to hunting shrews as a part of their diet and are effective hunters (C. Kessler, pers. comm., 2003).
Chemical: Anticoagulant poisons such as brodifacoum have been used successfully to eradicate rats from many islands, however, insectivores such as the shrew S. murinus are less susceptible to the application of toxins such as brodifacoum or 1080; studies have suggested the toxin would have to be applied at unacceptably high concentrations to kill the animal (Eason et al. 2002, Morris and Morris 1991, in Seymour et al., 2005). Secondary poisoning of birds, which has occurred in the Seychelles for example, suggests that native or endangered birds may face undue risk because of excess use of such toxins (Shah 2001, Thorsen et al., 2000, in Seymour et al., 2005).
Biological: Cats may reduce shrew densities around structures - although they seldom eat them. Owls will consume large numbers of shrews. Mowing grass around structures may increase predation of shrews (Schmidt, 1994).

Pathway
Due to it's commensal habit, this species is most likely transported unknowingly in cargoes or personal effects.

Principal source:
FULL ACCOUNT FOR: *Suncus murinus*

Compiler: Karen Varnham & IUCN/SSC Invasive Species Specialist Group (ISSG)

Review: Karen Varnham.

Publication date: 2006-04-06

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BIBLIOGRAPHY

26 references found for *Suncus murinus*

Management information


Summary: This report reviews available information on the adverse effects of 14 alien vertebrates considered to be ‘significant invasive species on islands of the South Pacific and Hawaii, supplementing the authors’ experience with that of other workers.


Summary: Contains information an abortive attempt to eradicate musk shrews from a Mauritian offshore island.


Conservation evidence.com., undated. The implementation of a live trapping programme in an attempted eradication of the Asian musk shrew *Suncus murinus* on Ile aux Aigrettes, Mauritius


Summary: A Guide To The Identification And Collection Of New Zealand Rodents, information on trapping methods.


Summary: A preliminary study of possible methods to remove shrews from a Mauritian offshore island. Includes information on attempts to control shrews with brodifacoum.

Seymour A, Varnham K, Sugoto Roy, Stephen Harris, Lucy Bhageerutty, Stuart Church, Alex Harris, Nancy V. Jennings, Carl Jones, Ashok Khadun, John Mauremootoo, Tabetha Newman, Vikash Tatayah, Charlotte Webbon, Gavin Wilson, 2005. Mechanisms underlying the failure of an attempt to eradicate the invasive Asian musk shrew *Suncus murinus* from an island nature reserve. Biological Conservation Volume 125, Issue 1, September 2005, Pages 23-35


Summary: Eradication case study in *Turning the tide: the eradication of invasive species.*

General information
SUMMARY: Information about various aspects of reproduction in S. murinus.


Summary: Information about the diet of musk shrews in India.


Summary: In-depth book about the natural history of shrews.


Summary: Information about various aspects of reproduction in S. murinus.


Summary: Describes the effects on introduced species on the native wildlife of Guam.


Physiology and Behaviour 61(3): 387-394.

Summary: Describes investigations into the processes controlling sexual and reproductive behaviour in Suncus murinus.


Summary: Contains comparisons of the breeding behaviour of shrews from two localities and describes attempts to cross shrews from the two groups.


Experimental Animals 40.

Summary: Laboratory study of effects of body weight difference on mating success.


Summary: An online database that provides taxonomic information, common names, synonyms and geographical jurisdiction of a species. In addition links are provided to retrieve biological records and collection information from the Global Biodiversity Information Facility (GBIF) Data Portal and bioscience articles from BioOne journals.


Summary: A description of the skinks of Mauritius, with discussion of their conservation status and threats posed to them.


Summary: This article presents the historic of introductions in the Reunion island.


Summary: Available from: [Accessed 10 April 2008]


Summary: Information on the distribution of all known mammal species, with synonyms, conservation status and other comments.


Summary: Catalogue des vert?br?s indig?nes et exotiques de La R?union


Summary: Describes and discusses several lines of evidence illustrating the impact of brown tree snakes and, to a lesser extent, other introduced species on native lizard populations.


Summary: Investigates the extent of genetic differentiation in musk shrews from different geographic locations.


Summary: Investigates variation in chromosome number in Asian populations of musk shrews.