

*Rattus rattus*  [简体中文](#) [正體中文](#)

**System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Rodentia	Muridae

**Common name** Hausratte (German), European house rat (English), bush rat (English), blue rat (English), ship rat (English), roof rat (English), black rat (English)

**Synonym** *Mus rattus* , Linnaeus, 1758  
*Mus alexandrinus* , Geoffroy, 1803  
*Musculus frugivorus* , Rafinesque, 1814  
*Mus novaezelandiae* , Buller, 1870

**Similar species** *Rattus norvegicus*

**Summary** A native of the Indian sub-continent, the ship rat (*Rattus rattus*) has now spread throughout the world. It is widespread in forest and woodlands as well as being able to live in and around buildings. It will feed on and damage almost any edible thing. The ship rat is most frequently identified with catastrophic declines of birds on islands. It is very agile and often frequents tree tops searching for food and nesting there in bunches of leaves and twigs.



[view this species on IUCN Red List](#)

## Species Description

A slender rat with large hairless ears, the ship rat (*Rattus rattus*) may be grey-brown on the back with either a similarly coloured or creamish-white belly, or it may be black all over. The uniformly-coloured tail is always longer than the head and body length combined. Its body weight is usually between 120 and 160 g but it can exceed 200 g.

The work of Yosida (1980) and his co-workers has shown that there are two forms of *R. rattus* that differ in chromosome number. The more widespread Oceanic form has 38 chromosomes and is the ship rat of Europe, the Mediterranean region, America, Australia and New Zealand. Present indications are that it is the Oceanic form that has reached islands in the South Pacific, but studies are needed to confirm this. The Asian form has probably reached some islands north of the equator, e.g. the Caroline Islands. On the basis of colour variation in rats on Ponape and Koror Islands, described by Johnson (1962) as *Rattus rattus mansorius*, we suspect that these rats may be the Asian form of *R. rattus* (SPREP, 2000).

## Notes

Ship rats can be widespread, utilising most habitat types, but they show a preference for drier habitats. They generally avoid swimming.

## Lifecycle Stages

*Rattus rattus*: gestation 20-22 days; weaning 21-28 days; sexual maturity 3-4 months; total life may not exceed two years.

## Habitat Description

Ship rats can be widespread, utilising most habitat types, but they show a preference for drier habitats. They generally avoid swimming. Ship rats in a New Zealand study (Hooker and Innes, 1995; in Innes, 2001) were mostly arboreal, but were also frequently recorded on the ground. The mean range length for females was 103m, and 194m for males. Another study (Dowding and Murphy, 1994; in Innes, 2001) found that rats generally used 3-4 dens each throughout their range. In the Mediterranean region *R. rattus* is most common in forests and shrublands up to 1080m in elevation (Martin *et al.*, 2000).

## Reproduction

A placental mammal with dependent young. Litter size 3-10 (average 5-8), with frequency of litters dependent on season and food supply. The interval between litters may be as little as 27 days.

## Nutrition

Ship rats are omnivorous generalists, yet can be very selective feeders. They eat both plant and animal matter all year round.

A Japanese study showed that *R. rattus* is primarily herbivorous, but can change its food habits when it is thirsty, or when food is in short supply (Yabe, 2004).

## General Impacts

The ship rat has directly caused or contributed to the extinction of many species of wildlife including birds, small mammals, reptiles, invertebrates, and plants, especially on islands. Ship rats are omnivorous and capable of eating a wide range of plant and animal foods. These include native snails, beetles, spiders, moths, stick insects and cicadas and the fruit of many different plants (Innes 1990). They also prey on the eggs and young of forest birds (Innes *et al.*, 1999). In the recovery programme for the endangered Rarotonga flycatcher or kakerori (see [Pomarea dimidiata in the IUCN Red List of Threatened Species](#)), Robertson *et al.* (1994) identified ship rats as the most important predator affecting the breeding success of this bird. Several cases are known where predation on seabirds can be reliably attributed to ship rats. These include sooty terns (see [Sterna fuscata in IUCN Red List of Threatened Species](#)) in the Seychelles Islands (Feare, 1979), Bonin petrels (see [Pterodroma hypoleuca in IUCN Red List of Threatened Species](#)) in Hawai'i (Grant *et al.*, 1981), Galapagos dark-rumped petrels (see [Pterodroma phaeopygia in IUCN Red List of Threatened Species](#)) in the Galapagos Islands (Harris, 1970), and white-tailed tropicbirds (see [Phaethon lepturus in IUCN Red List of Threatened Species](#)) in Bermuda (Gross, 1912).

The ship rat is most frequently identified with catastrophic declines of birds on islands. The best documented examples in the Pacific region are Midway Island in the Leeward Islands of Hawai'i (Johnson, 1945; Fisher and Baldwin, 1946), Lord Howe Island (Hindwood, 1940; Recher and Clark, 1974) and Big South Cape Island, New Zealand (Atkinson and Bell, 1973). Atkinson (1977) brought together circumstantial evidence suggesting that ship rats, rather than disease, were responsible for the decline of many species of Hawai'ian native birds during the 19th century.

There are few indications of rat-induced declines in native birds on islands nearer the equator (latitude 15°N to 20°S). This zone coincides with the distribution of native land crabs, animals that also prey on birds and their eggs. The long co-existence between land crabs and some island birds may have resulted in the development of behaviours among the birds that gives them a degree of protection against rats. Atkinson (1985) suggested that this might be the reason why rat-induced catastrophes are less apparent within the equatorial zone, but this hypothesis has never been tested (SPREP, 2000).

Species of weight similar to or smaller than that of rats appear to be the most vulnerable to predation. Impacts also appear to be more severe on smaller islands, where rat densities tend to be higher and do not fluctuate. Constant predation pressure results in a reduction in colony size on these islands (Martin *et al.*, 2000).

Both *R. rattus* and *R. norvegicus* transmit the plague bacterium (*Yersinia pestis*) via fleas in certain areas of the world. There have been a series of recent outbreaks in Madagascar in recent years (Boiser *et al.* 2002).

## Management Info

**Preventative measures:** Research has shown that it can often be difficult to eradicate rats from islands in the early stages of invasion, hence it is better to prevent rodents arriving on islands in the first place. Eliminating a single invading rat can be disproportionately difficult because of atypical behaviour by the rat in the absence of conspecifics, and because bait can be less effective in the absence of competition for food ([Russell et al., 2005](#)). [Weihong et al. \(1999\)](#) provide useful information regarding the detection of rodent species using different trapping methods and bait.

**Physical:** The use of poison baits is the only proven way to remove rodents from large islands. Trapping generally fails to remove all individuals, as trap-shy animals can survive and repopulate the island (DOC, 2004). **Chemical:** *Rattus rattus* can be eradicated from small areas or seasonally controlled using proprietary rat poison products in an appropriate manner. The largest island to date from which ship rats have been eradicated is Barrow Island (23 000 ha, Western Australia) (Morris, 2002).

Second-generation anticoagulant poisons are used widely for ship rat control, but possible consequences of any ongoing control should always be considered. These consequences include primary or secondary poisoning of species we are aiming to protect or other non-target species, secondary poisoning of other vertebrate pests such as cats, and development of resistance to these poisons by ship rats. It is not known whether their tree-climbing habits will make eradication more difficult (SPREP, 2000).

Fisher et al. (2004) suggest that diphacinone especially, and also coumatetralyl and warfarin, should be evaluated in field studies as alternative rodenticides in New Zealand. Brodifacoum, the most widely used rodenticide in New Zealand currently, can acquire persistent residues in non-target wildlife. [Mineau et al. \(2004\)](#) presented a risk assessment of second generation rodenticides at the 2nd National Invasive Rodent Summit. [O'Connor and Eason \(2000\)](#) discusses the variety of baits which are available for use on offshore islands in New Zealand.

An investigation [Spurr et al. \(2007\)](#) was carried out to assess the behavioural response of ship rats to four different bait station types. Yellow plastic pipe, wooden box ('rat motel'), and wooden tunnel bait stations were found all suitable for surveillance of ship rats and the first two at least for Norway rats (all were readily entered and had a similar amount of bait eaten from them).

**Biological:** Contraceptive methods of control are currently experimental, but the potential for effective control using contraceptive methods is promising. National Wildlife Research Center (USA) scientists are working on several possible formulations that may make effective oral immunisation possible (Nash and Miller, 2004).

**Integrated management:** [Guidelines for the Eradication of Rats From Islands Within the Falklands Group](#) offers guidelines for the eradication of rats from islands, based on the experiences in eradicating rats from the Falklands group. This paper offers guidelines for the eradication of rats from islands, based on the experiences in eradicating rats from the Falklands group.

## Pathway

*Rattus rattus* usually stow away in freight carried within the hull, holds and living spaces of ships

## Principal source:

**Compiler:** IUCN SSC Invasive Species Specialist Group

**Review:** Dick Veitch, Auckland, New Zealand.

**Publication date:** 2011-01-11

## ALIEN RANGE

[1] AMERICAN SAMOA  
[5] ANTIGUA AND BARBUDA  
[2] BAHAMAS  
[1] BERMUDA

[1] ANGUILLA  
[20] AUSTRALIA  
[1] BARBADOS  
[3] BRITISH INDIAN OCEAN TERRITORY

[3] CANADA	[4] CAYMAN ISLANDS
[3] COOK ISLANDS	[1] CURACAO
[1] DOMINICA	[1] DOMINICAN REPUBLIC
[7] ECUADOR	[1] FALKLAND ISLANDS (MALVINAS)
[11] FIJI	[4] FRANCE
[12] FRENCH POLYNESIA	[6] FRENCH SOUTHERN TERRITORIES
[1] GREECE	[2] GUADELOUPE
[1] GUAM	[1] INDONESIA
[4] ITALY	[1] JAMAICA
[8] KIRIBATI	[2] MALTA
[9] MARSHALL ISLANDS	[5] MARTINIQUE
[4] MAURITIUS	[1] MAYOTTE
[4] MEXICO	[8] MICRONESIA, FEDERATED STATES OF
[1] MONTSERRAT	[1] NAURU
[7] NEW CALEDONIA	[64] NEW ZEALAND
[1] NIUE	[4] NORTHERN MARIANA ISLANDS
[5] PALAU	[6] PAPUA NEW GUINEA
[1] PERU	[1] PORTUGAL
[1] PUERTO RICO	[1] REUNION
[1] SAINT BARTHELEMY	[3] SAINT HELENA
[1] SAINT LUCIA	[1] SAINT MARTIN (FRENCH PART)
[1] SAMOA	[1] SAO TOME AND PRINCIPE
[6] SEYCHELLES	[10] SOLOMON ISLANDS
[2] SPAIN	[1] TANZANIA, UNITED REPUBLIC OF
[3] TONGA	[1] TRINIDAD AND TOBAGO
[1] TURKS AND CAICOS ISLANDS	[3] TUVALU
[1] UNITED KINGDOM	[19] UNITED STATES
[3] UNITED STATES MINOR OUTLYING ISLANDS	[6] VANUATU
[2] VIRGIN ISLANDS, BRITISH	[1] VIRGIN ISLANDS, U.S.
[2] WALLIS AND FUTUNA	

**Red List assessed species 222: EX = 21; EW = 1; CR = 43; EN = 53; VU = 57; NT = 24; DD = 4; LC = 19;**

<a href="#">Acomys nesiotus</a> <b>DD</b>	<a href="#">Acrocephalus aequinoctialis</a> <b>EN</b>
<a href="#">Acrocephalus caffer</a> <b>EN</b>	<a href="#">Acrocephalus kerearako</a> <b>NT</b>
<a href="#">Acrocephalus rimatarae</a> <b>VU</b>	<a href="#">Acrocephalus rodericanus</a> <b>EN</b>
<a href="#">Acrocephalus taiti</a> <b>VU</b>	<a href="#">Aegialomys galapagoensis</a> <b>VU</b>
<a href="#">Afroablepharus africana</a> <b>VU</b>	<a href="#">Alectroenas rodericana</a> <b>EX</b>
<a href="#">Alectryon macrococcus</a> <b>CR</b>	<a href="#">Alsophis antiquae</a> <b>CR</b>
<a href="#">Amaurocichla bocagei</a> <b>VU</b>	<a href="#">Anisomys imitator</a> <b>LC</b>
<a href="#">Aphrastura masafuerae</a> <b>CR</b>	<a href="#">Aplonis cinerascens</a> <b>VU</b>
<a href="#">Aplonis fusca</a> <b>EX</b>	<a href="#">Aplonis pelzelni</a> <b>CR</b>
<a href="#">Atlantisia rogersi</a> <b>VU</b>	<a href="#">Bostrychia bocagei</a> <b>CR</b>
<a href="#">Branta sandvicensis</a> <b>VU</b>	<a href="#">Bulweria bulwerii</a> <b>LC</b>
<a href="#">Callaeas cinereus</a> <b>EN</b>	<a href="#">Camarhynchus heliobates</a> <b>CR</b>
<a href="#">Camarhynchus pauper</a> <b>CR</b>	<a href="#">Cettia haddeni</a> <b>NT</b>
<a href="#">Charmosyna amabilis</a> <b>CR</b>	<a href="#">Chasiempis ibidis</a> <b>EN</b>
<a href="#">Chelonia mydas</a> <b>EN</b>	<a href="#">Clytorhynchus sanctaecrucis</a> <b>EN</b>
<a href="#">Columba bollii</a> <b>LC</b>	<a href="#">Columba junoniae</a> <b>NT</b>
<a href="#">Columba trocaz</a> <b>LC</b>	<a href="#">Coracina newtoni</a> <b>CR</b>
<a href="#">Coracina typica</a> <b>VU</b>	<a href="#">Corvus hawaiiensis</a> <b>EW</b>
<a href="#">Cyanolimnas cerverai</a> <b>CR</b>	<a href="#">Cyanoramphus auriceps</a> <b>NT</b>
<a href="#">Cyanoramphus cookii</a> <b>EN</b>	<a href="#">Cyanoramphus saisseti</a> <b>VU</b>
<a href="#">Dendrocygna arborea</a> <b>VU</b>	<a href="#">Ducula aurorae</a> <b>EN</b>

[Ducula galeata](#) EN  
[Eleutherodactylus orcutti](#) CR  
[Epicrates monensis](#) EN  
[Eudytes schlegeli](#) VU  
[Eunymphicus cornutus](#) VU  
[Falco eleonorae](#) LC  
[Ferminia cerverai](#) EN  
[Foudia rubra](#) EN  
[Fregata aquila](#) VU  
[Gallicolumba erythroptera](#) CR  
[Gallinula nesiotis](#) VU  
[Gerygone modesta](#) VU  
[Haematopus chathamensis](#) EN  
[Hemiphaga novaeseelandiae](#) NT  
[Hypsipetes olivaceus](#) VU  
[Lanius newtoni](#) CR  
[Larus audouinii](#) NT  
[Larus fuliginosus](#) VU  
[Leiopelma hochstetteri](#) VU  
[Leptodactylus fallax](#) CR  
[Megalurulus mariei](#) LC  
[Melamprosops phaeosoma](#) CR  
[Mesembriomys macrurus](#) LC  
[Mesocapromys auritus](#) EN  
[Mesocapromys sanfelipensis](#) CR  
[Mimus melanotis](#) EN  
[Moho bishopi](#) EX  
[Mohoua ochrocephala](#) EN  
[Myadestes palmeri](#) CR  
[Mystacina robusta](#) CR  
[Neospiza concolor](#) CR  
[Nesofregatta fuliginosa](#) EN  
[Nesoryzomys darwini](#) EX  
[Nesoryzomys indefessus](#) EX  
[Nesoryzomys swarthi](#) VU  
[Notiomystis cincta](#) VU  
[Oligoryzomys victus](#) EX  
[Oreomystis bairdi](#) CR  
[Oryzomys gorgasi](#) EN  
[Otus capnodes](#) CR  
[Pachycephala jacquinoti](#) NT  
[Palmeria dolei](#) CR  
[Phalacrocorax aristotelis](#) LC  
[Phalacrocorax harrisi](#) VU  
[Phoboscincus bocourti](#) EN  
[Phoebastria irrorata](#) CR  
[Pomarea dimidiata](#) EN  
[Pomarea iphis](#) VU  
[Pomarea nigra](#) CR  
[Pomarea whitneyi](#) CR  
[Porzana palmeri](#) EX  
[Procellaria cinerea](#) NT  
[Procellaria parkinsoni](#) VU  
[Progne modesta](#) VU  
[Eleutherodactylus cooki](#) VU  
[Emberiza socotrana](#) VU  
[Eretmochelys imbricata](#) CR  
[Eumeces longirostris](#) CR  
[Eunymphicus uvaeensis](#) EN  
[Falco punctatus](#) VU  
[Foudia flavicans](#) VU  
[Foudia sechellarum](#) NT  
[Fulica alai](#) VU  
[Gallicolumba kubaryi](#) VU  
[Gerygone insularis](#) EX  
[Gymnuromys roberti](#) LC  
[Haematopus meadewaldoi](#) EX  
[Hydromys chrysogaster](#) LC  
[Isodon auratus](#) VU  
[Lariscus obscurus](#) NT  
[Larus cachinnans](#) LC  
[Leiopelma hamiltoni](#) EN  
[Leiopelma pakeka](#) VU  
[Loxioides bailleui](#) CR  
[Megapodius laperouse](#) EN  
[Melomys fraterculus](#) CR  
[Mesocapromys angelcabrerai](#) EN  
[Mesocapromys nanus](#) CR  
[Mimus macdonaldi](#) VU  
[Mimus trifasciatus](#) CR  
[Moho braccatus](#) EX  
[Mundia elpenor](#) EX  
[Mysateles meridionalis](#) CR  
[Myzomela chermesina](#) VU  
[Nesocichla eremita](#) NT  
[Nesoromys ceramicus](#) EN  
[Nesoryzomys fernandinae](#) VU  
[Nesoryzomys narboroughi](#) VU  
[Nestor meridionalis](#) EN  
[Oceanodroma homochroa](#) EN  
[Oligosoma acrinasum](#) NT  
[Oreomystis mana](#) EN  
[Oryzomys nelsoni](#) EX  
[Otus insularis](#) EN  
[Pachyptila vittata](#) LC  
[Peromyscus madrensis](#) EN  
[Phalacrocorax featherstoni](#) EN  
[Philesturnus carunculatus](#) NT  
[Phoebastria albatrus](#) VU  
[Phoebetria fusca](#) EN  
[Pomarea fluxa](#) EX  
[Pomarea mira](#) EX  
[Pomarea nukuhiuae](#) EX  
[Porzana atra](#) VU  
[Procellaria aequinoctialis](#) VU  
[Procellaria conspicillata](#) VU  
[Procellaria westlandica](#) VU  
[Prosobonia cancellata](#) EN

<a href="#">Pseudobulweria rostrata</a>	NT	<a href="#">Psittacula eques</a>	EN
<a href="#">Psittirostra psittacea</a>	CR	<a href="#">Pterodroma alba</a>	EN
<a href="#">Pterodroma cahow</a>	EN	<a href="#">Pterodroma cookii</a>	VU
<a href="#">Pterodroma hasitata</a>	EN	<a href="#">Pterodroma hypoleuca</a>	LC
<a href="#">Pterodroma inexpectata</a>	NT	<a href="#">Pterodroma leucoptera</a>	VU
<a href="#">Pterodroma madeira</a>	EN	<a href="#">Pterodroma magentae</a>	CR
<a href="#">Pterodroma phaeopygia</a>	CR	<a href="#">Pterodroma sandwichensis</a>	VU
<a href="#">Pterodroma solandri</a>	VU	<a href="#">Ptilinopus chalcurus</a>	VU
<a href="#">Ptilinopus coralensis</a>	NT	<a href="#">Ptilinopus insularis</a>	VU
<a href="#">Ptilinopus rarotongensis</a>	VU	<a href="#">Puffinus auricularis</a>	CR
<a href="#">Puffinus bulleri</a>	VU	<a href="#">Puffinus griseus</a>	NT
<a href="#">Puffinus mauretanicus</a>	CR	<a href="#">Puffinus newelli</a>	EN
<a href="#">Puffinus pacificus</a>	LC	<a href="#">Puffinus yelkouan</a>	NT
<a href="#">Rallus longirostris</a>	LC	<a href="#">Rattus adustus</a>	DD
<a href="#">Rattus bontanus</a>	DD	<a href="#">Rattus elaphinus</a>	NT
<a href="#">Rattus enganus</a>	DD	<a href="#">Rattus feliceus</a>	NT
<a href="#">Rattus hainaldi</a>	EN	<a href="#">Rattus jobiensis</a>	NT
<a href="#">Rattus lugens</a>	EN	<a href="#">Rattus macleari</a>	EX
<a href="#">Rattus nativitatis</a>	EX	<a href="#">Rattus simalurensis</a>	EN
<a href="#">Rattus tunneyi</a>	LC	<a href="#">Rhynchotos jubatus</a>	EN
<a href="#">Rowettia goughensis</a>	CR	<a href="#">Sabal bermudana</a>	EN
<a href="#">Saxicola dacotiae</a>	NT	<a href="#">Spheniscus humboldti</a>	VU
<a href="#">Spheniscus mendiculus</a>	EN	<a href="#">Sterna dougalii</a>	LC
<a href="#">Sterna hirundo</a>	LC	<a href="#">Sylvilagus graysoni</a>	EN
<a href="#">Synthliboramphus craveri</a>	VU	<a href="#">Synthliboramphus hypoleucus</a>	VU
<a href="#">Synthliboramphus wumizusume</a>	VU	<a href="#">Terpsiphone corvina</a>	CR
<a href="#">Todiramphus gambieri</a>	CR	<a href="#">Todiramphus godeffroyi</a>	CR
<a href="#">Todiramphus ruficollaris</a>	VU	<a href="#">Tokudaia osimensis</a>	EN
<a href="#">Trichocichla rufa</a>	EN	<a href="#">Troglodytes cobbi</a>	VU
<a href="#">Turnagra capensis</a>	EX	<a href="#">Turnagra tanagra</a>	EX
<a href="#">Vini kuhlii</a>	EN	<a href="#">Vini peruviana</a>	VU
<a href="#">Vini ultramarina</a>	EN	<a href="#">Xenicus longipes</a>	EX
<a href="#">Xerocrassa caroli</a>	LC	<a href="#">Xerocrassa ebusitana</a>	NT
<a href="#">Zoothera margaretae</a>	NT	<a href="#">Zosterops albogularis</a>	CR
<a href="#">Zosterops chloronothus</a>	CR	<a href="#">Zosterops modestus</a>	EN
<a href="#">Zosterops strenuus</a>	EX	<a href="#">Zosterops tenuirostris</a>	EN

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Burbidge, A.A., 2004. Montebello Renewal: Western Shield review February 2003. *Conservation Science Western Australia* 5(2), 194-201.

Burbidge and Morris., 2002. Introduced mammal eradications for nature conservation on Western Australian islands: a review. In *Turning the tide: the eradication of invasive species*: 64-70. Veitch, C.R. and Clout, M.N.(eds). IUCN SSC Invasive Species Specialist Group. IUCN. Gland, Switzerland and Cambridge, UK.

**Summary:** Available from: [http://www.issg.org/database/species/reference\\_files/vulvul/Burbidge.pdf](http://www.issg.org/database/species/reference_files/vulvul/Burbidge.pdf) [Accessed 12 March 2003]

Carter and Bright., 2002. Habitat refuges as alternatives to predator control for the conservation of endangered Mauritian birds. In *Turning the tide: the eradication of invasive species*: 71-78. Veitch, C.R. and Clout, M.N.(eds). IUCN SSC Invasive Species Specialist Group. IUCN. Gland, Switzerland and Cambridge, UK.

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

Chagos Island Restoration Project 2006 (CERP). Fauna and Flora International.

Christie, J.E., D.J. Brown, I. Westbrooke and E.C. Murphy., 2009. Environmental predictors of stoat (*Mustela erminea*) and ship rat (*Rattus rattus*) capture success. DOC Research & Development Series 305. Published by Publishing Team Department of Conservation PO Box 10420, The Terrace Wellington 6143, New Zealand

**Summary:** Abstract: The association between capture success of stoats (*Mustela erminea*) and ship rats (*Rattus rattus*) and landscape-scale environmental predictors was explored using trapping data from three stoat control areas located in podocarp/broadleaved forest in New Zealand. Stoat capture success was higher at trap sites where a rat was also captured at the same trap or a stoat was captured at a neighbouring trap. Drier trap sites with good soil drainage and increased proximity to the operational trapping boundary were also associated with increased stoat capture. Rat capture success was higher at trap sites where a rat had been captured at a neighbouring trap, and at trap sites that were on steeper ground, more easterly facing and within forest habitat. Trap sites with generally poor soil conditions, i.e. sites with lower soil calcium levels and wetter sites with poor drainage, and increasing distance from the forest edge were also associated with increased rat capture. There were highly variable relationships between rat and stoat capture and landscape-scale environmental predictors between the three stoat control areas. This could be due to differing topography, but also to the highly correlated nature of many of the topographic, climate and habitat predictors. Further research specifically designed to separate these effects should focus on the variables identified as common between all stoat control areas in this study. Additional investigations of whether rats captured in double trap sets act as additional bait for stoats would have practical benefits for stoat control areas. The variability of the results emphasises the importance of ensuring that traps are abundant and widespread in stoat control operations.

Cossios E. Daniel, 2010. Vertebrados naturalizados en el Perú: historia y estado del conocimiento (Naturalised vertebrates in Peru: history and state of knowledge) *Rev. peru. biol.* 17(2): 179 - 189 (Agosto 2010)

**Summary:** Available from: <http://sisbib.unmsm.edu.pe/BVrevistas/biologia/v17n2/pdf/a07v17n2.pdf> [Accessed 23 February 2011]

Cunningham, D.M. and Moors, P.J., 1993. Guide To The Identification And Collection Of New Zealand Rodents. Department of Conservation, NZ.

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

Dilks, P and Towns, D., 2002. Developing tools to detect and respond to rodent invasions of islands: workshop report and recommendations. DOC SCIENCE INTERNAL SERIES 59

**Summary:** Available from: <http://www.doc.govt.nz/upload/documents/science-and-technical/DSIS59.pdf> [Accessed 19 February 2008]

Doty, R. E. 1945. Rat control on Hawaiian sugar cane plantations. *Hawaiian Planters Record* 49(2): 71-241.

Gerber, G. 1997. Nesting Behavior of the Little Cayman rock iguana, *Cyclura nubila caymanensis*. Joint Annual Meeting, American Society of Ichthyologists and Herpetologists/Herpetologists League/Society for the Study of Amphibians and Reptiles. University of Washington, Seattle, U.S.A.

Innes, J., Hay, R., Flux, I., Bradfield, P., Speed, H. and Jansen, P. 1999. Successful recovery of North Island kokako *Callaeas cinerea wilsoni* populations, by adaptive management. *Biological conservation* 87: 201-214.

[Invasive Species Specialist Group](http://www.issg.org). 2003. Takitimu Conservation Area (Cook Islands) - Landowning clans in charge of the Kakerori Recovery Programmes. In: *Aliens 17. Invasive Species Specialist Group of the IUCN Species Survival Commission*

**Summary:** Available from: [http://www.issg.org/pdf/aliens\\_newsletters/A17.pdf](http://www.issg.org/pdf/aliens_newsletters/A17.pdf) [Accessed 12 March 2010]



# GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: *Rattus rattus*

[IUCN 2010. IUCN Red List of Threatened Species. Version 2010.4.](#)

**Summary:** The IUCN Red List of Threatened Species provides taxonomic, conservation status and distribution information on taxa that have been globally evaluated using the IUCN Red List Categories and Criteria. This system is designed to determine the relative risk of extinction, and the main purpose of the IUCN Red List is to catalogue and highlight those taxa that are facing a higher risk of global extinction (i.e. those listed as Critically Endangered, Endangered and Vulnerable). The IUCN Red List also includes information on taxa that are categorized as Extinct or Extinct in the Wild; on taxa that cannot be evaluated because of insufficient information (i.e. are Data Deficient); and on taxa that are either close to meeting the threatened thresholds or that would be threatened were it not for an ongoing taxon-specific conservation programme (i.e. are Near Threatened).

Available from: <http://www.iucnredlist.org/> [Accessed 25 May 2011]

IUCN South-Eastern European e-Bulletin December 2006. Issue 11: Rats exterminated in important colony of Eleonora's falcon

**Summary:** The IUCN Red List of Threatened Species provides taxonomic, conservation status and distribution information on taxa that have been globally evaluated using the IUCN Red List Categories and Criteria. This system is designed to determine the relative risk of extinction, and the main purpose of the IUCN Red List is to catalogue and highlight those taxa that are facing a higher risk of global extinction (i.e. those listed as Critically Endangered, Endangered and Vulnerable). The IUCN Red List also includes information on taxa that are categorized as Extinct or Extinct in the Wild; on taxa that cannot be evaluated because of insufficient information (i.e. are Data Deficient); and on taxa that are either close to meeting the threatened thresholds or that would be threatened were it not for an ongoing taxon-specific conservation programme (i.e. are Near Threatened).

Available from: <http://www.iucnredlist.org/> [Accessed 25 May 2011]

[IUCN/SSC Invasive Species Specialist Group \(ISSG\), 2010. A Compilation of Information Sources for Conservation Managers.](#)

**Summary:** This compilation of information sources can be sorted on keywords for example: Baits & Lures, Non Target Species, Eradication, Monitoring, Risk Assessment, Weeds, Herbicides etc. This compilation is at present in Excel format, this will be web-enabled as a searchable database shortly. This version of the database has been developed by the IUCN SSC ISSG as part of an Overseas Territories Environmental Programme funded project XOT603 in partnership with the Cayman Islands Government - Department of Environment. The compilation is a work under progress, the ISSG will manage, maintain and enhance the database with current and newly published information, reports, journal articles etc.

[James, R.E., and M.N. Clout, 1996. Nesting success of New Zealand pigeons \(\*Hemiphaga novaeseelandiae\*\) in response to a rat \(\*Rattus rattus\*\) poisoning programme at Wenderholm Regional Park. \*New Zealand Journal of Ecology\* 20\(1\): 45-51. \[New Zealand Ecological Society\]\(#\)](#)

**Summary:** Available from: [http://www.newzealandecology.org/nzje/free\\_issues/NZJcol20\\_1\\_45.pdf](http://www.newzealandecology.org/nzje/free_issues/NZJcol20_1_45.pdf) [Accessed December 11 2007]

Johnson, M. S. 1945. Rodent control on Midway Islands. *US Naval Medical Bulletin* 45: 384-398.

Lorvelec, O., Delloue, X., Pascal, M., & mege, S. 2004. Impacts des mammifères allochtones sur quelques espèces autochtones de l'île Fajou (Réserve Naturelle du Grand Cul-de-sac Marin, Guadeloupe), établis à l'issue d'une tentative d'éradication. *Revue D'Ecologie - La Terre et La Vie* 59(1-2): 293-307.

**Summary:** French language. Information about impacts, eradication methodology, results and discussion in French.

[Lovegrove, T. G., C. H. Zeiler, B. S. Greene, B. W. Green, R. Gaastra, and A. D. MacArthur., 2002. Alien plant and animal control and aspects of ecological restoration in a small mainland island : Wenderholm Regional Park, New Zealand. In \*Turning the tide: the eradication of invasive species\* : 155-163. Veitch, C.R. and Clout, M.N.\(eds\). IUCN SSC Invasive Species Specialist Group. IUCN. Gland. Switzerland and Cambridge. UK.](#)

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

[MacKay, J. W. B.; Russell, J. C. 2005. Ship rat \*Rattus rattus\* eradication by trapping and poison-baiting on Goat Island, New Zealand. \*Conservation Evidence\*, 2, 142-144.](#)

**Summary:** Available from: <http://www.conservationevidence.com/Attachments/PDF242.pdf> [Accessed 12 March 2010]

[Marine Turtle Newsletter No. 106, 2004](#)

**Summary:** Describes the rat eradication on Sangalaki Is. as part of a green turtle (*Chelonia mydas*) conservation programme.

Available from: <http://www.seaturtle.org/mtn/archives/mtn106/> [Accessed 19 February 2008]

[McClelland, P.J., 2002. Eradication of Pacific rats \(\*Rattus exulans\*\) from Whenua Hou Nature Reserve \(Codfish Island\), Putauhinu and Rarotoka Islands, New Zealand. In \*Turning the tide: the eradication of invasive species\*: 173-181. Veitch, C.R. and Clout, M.N.\(eds\). IUCN SSC Invasive Species Specialist Group. IUCN. Gland. Switzerland and Cambridge. UK.](#)

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

*Megapode Newsletter* Vol. 18, nr. 1 October 2004. *BirdLife/WPA/SSC Megapode Specialist Group*

**Summary:** Describes observations and conservation through rat eradication.

[Meier, G., 2003. InGrip-Report No.1, prepared for Turtle Foundation by InGrip-Consulting & Animal Control. Hauptstr. 1 - 82541 Ammerland, Germany.](#)

**Summary:** This report describes a successful rat eradication project on Sangalaki Island, East-Kalimantan in detail.

[Merton, D. G., Climo, V. Laboudallon, S. Robert, and C. Mander., 2002. Alien mammal eradication and quarantine on inhabited islands in the Seychelles. In \*Turning the tide: the eradication of invasive species\*: 182-198. Veitch, C.R. and Clout, M.N.\(eds\). IUCN SSC Invasive Species Specialist Group. IUCN. Gland. Switzerland and Cambridge. UK.](#)

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

[Micol and Jouvantin, 2002. Eradication of rats and rabbits from Saint-Paul Island. In \*Turning the tide: the eradication of invasive species\*: 199-205. Veitch, C.R. and Clout, M.N.\(eds\). IUCN SSC Invasive Species Specialist Group. IUCN. Gland. Switzerland and Cambridge. UK.](#)

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

[Mineau, Pierre; Richard, F. Shore; Robert, C. Hosea and ward, B. Stone., 2004. Towards a Risk Assessment of Second Generation Rodenticides: Do We have Enough Information to Proceed? \*Wildlife Damage Management, Internet Center for USDA National Wildlife Research Center -Staff Publications. 2nd National Invasive Rodent Summit.\*](#)

**Summary:** Available from: [http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1730&context=icwdm\\_usdanwrc](http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1730&context=icwdm_usdanwrc) [Accessed 19 February 2008]

Moors, P. J., Atkinson, I. A. E. and Sherley, G. H. 1992. Reducing the rat threat to island birds. *Bird Conservation International* 2: 93-114.



Morris, 2002. The eradication of the black rat (*Rattus rattus*) on Barrow and adjacent islands off the north-west coast of Western Australia. In *Turning the tide: the eradication of invasive species* : 219-225. Veitch, C.R. and Clout, M.N.(eds). IUCN SSC Invasive Species Specialist Group. IUCN. Gland, Switzerland and Cambridge, UK.

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

O Connor, Cheryl E. and Charles, T. Eason., 2000. Rodent baits and delivery systems for island protection. *SCIENCE FOR CONSERVATION* 150

**Summary:** Available from: <http://www.doc.govt.nz/upload/documents/science-and-technical/sfc150.pdf> [Accessed 19 February 2008]


Pacific Invasives Initiative (PII), 2006. Eradicating invasive species from Kayangel Atoll, Palau

**Summary:** Available from: <http://www.issg.org/cii/PII/demo/kayangel.html> [Accessed 12 March 2010]

Pacific Invasives Initiative (PII), 2006. Mont Pani  Mammal Control  Proof-of-Concept  Project

**Summary:** Available from: <http://www.issg.org/cii/PII/demo/mtPanie.html> [Accessed 12 March 2010]

Page, A and Meier, G., 2006. Rat-free habitat doubled in the Chagos Archipelago. *Conservation News*. 2006 FFI, Oryx, 40(3), 255  256

Recher, H. F. and Clark, S. S. 1974. A biological survey of Lord Howe Island with recommendations for conservation of the island's wildlife. *Biological Conservation* 6: 263  273.

Robertson, H.A., 2000. Conservation of kakerori (*Pomarea dimidiata*), Rarotonga. Conservation Advisory Science Notes No. 272, Department of Conservation, Wellington.

**Summary:** Available from: <http://www.doc.govt.nz/upload/documents/science-and-technical/casn272.pdf> [Accessed 2 September 2008]

Robertson, H. A. Hay, J. R., Saul, E. K and McCormack, G.V. 1994. Recovery of the Kakerori: An Endangered Forest Bird of the Cook Islands, *Conservation Biology* 8 (4): 1078-1086.

Robertson, H.A.; Saul, E.K. 2004: Conservation of kakerori (*Pomarea dimidiata*) on the Cook Islands in 2002/03. DOC Science Internal Series 167. Department of Conservation, Wellington. 16 p.

**Summary:** Available from: <http://www.doc.govt.nz/upload/documents/science-and-technical/dsis167.pdf> [Accessed 2 September 2008]

Robertson, H.A.; Saul, E.K. 2005: Conservation of kakerori (*Pomarea dimidiata*) in the Cook Islands in 2003/04. DOC Research & Development Series 207. Department of Conservation, Wellington. 16 p.

**Summary:** Available from: <http://www.doc.govt.nz/upload/documents/science-and-technical/drds207.pdf> [Accessed 2 September 2008]

Robertson, H.A.; Saul, E.K. 2006: Conservation of kakerori (*Pomarea dimidiata*) in the Cook Islands in 2004/05. DOC Research & Development Series 246. Department of Conservation, Wellington. 18 p.

**Summary:** Available from: <http://www.doc.govt.nz/upload/documents/science-and-technical/drds246.pdf> [Accessed 2 September 2008]

Robertson, H.A.; Saul, E.K. 2007: Conservation of kakerori (*Pomarea dimidiata*) in the Cook Islands in 2005/06. DOC Research & Development Series 285. Department of Conservation, Wellington. 19 p.

**Summary:** Available from: <http://www.doc.govt.nz/upload/documents/science-and-technical/drds285.pdf> [Accessed 2 September 2008]

Robertson, H.A.; Saul, E.K. 2008: Conservation of kakerori (*Pomarea dimidiata*) in the Cook Islands in 2006/07. DOC Research & Development Series 296. Department of Conservation, Wellington. 19 p.

**Summary:** Available from: <http://www.doc.govt.nz/upload/documents/science-and-technical/drds296.pdf> [Accessed 2 September 2008]

Russell, James C., David R. Towns, Sandra H. Anderson and Mick N. Clout., 2005. Intercepting the first rat ashore. *Brief communications Nature* 437, 1107 (20 October 2005)

**Summary:** Available from: <http://www.nature.com/nature/journal/v437/n7062/pdf/4371107a.pdf> [Accessed 19 February 2008]

Sommer, E. 2006. Trip report. Unpublished report to RSPB.

Sowls, A. L. and G. V. Byrd., 2002. Preventing rat introductions to the Pribilof Islands, Alaska, USA. In *Turning the tide: the eradication of invasive species*: 406 - 414 IUCN SSC Invasive Species Specialist Group. IUCN. Gland, Switzerland and Cambridge, UK.

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

Spurr, E.B., G.A. Morriss, J. Turner, C.E. O'Connor, P. Fisher., 2007. Bait station preferences of ship rats

**Summary:** Available from: <http://www.doc.govt.nz/upload/documents/science-and-technical/drds271.pdf> [Accessed 19 June 2007]

Tershy, B. R., C. J. Donlan, B. S. Keitt, D. A. Croll, J. A. Sanchez, B. Wood, M. A. Hermosillo, G. R. Howald, and N. Biavaschi., 2002. Island conservation in north-west Mexico: a conservation model integrating research, education and exotic mammal eradication. In *Turning the tide: the eradication of invasive species*: 293-300. Veitch, C.R. and Clout, M.N.(eds). IUCN SSC Invasive Species Specialist Group. IUCN. Gland, Switzerland and Cambridge, UK.

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


The Garry Oak Ecosystems Recovery Team (GOERT)., 2007. Exotic vertebrate species in Garry oak and associated ecosystems in British Columbia


**Summary:** Available from: [http://www.goert.ca/pubs\\_invasive.php#vertebrate\\_species](http://www.goert.ca/pubs_invasive.php#vertebrate_species) [Accessed 13 February 2008]

Varnham, K. 2006. Non-native species in UK Overseas Territories: a review. JNCC Report 372. Peterborough: United Kingdom.

**Summary:** This database compiles information on alien species from British Overseas Territories.


Available from: <http://www.jncc.gov.uk/page-3660> [Accessed 10 November 2009]

Varnham, K. J. & Meier G. G. 2007. Ratum tal-Madonna rat control project, December 2006  March 2007. Final report. Unpublished report to BirdLife Malta & RSPB, 28pp.


Weihong, Ji.; C.R. Dick Veitch and John, L. Craig., 1999. An evaluation of the efficiency of rodent trapping methods: the effect of trap arrangement, cover type and bait. *New Zealand Journal of Ecology* (1999) 23(1): 45-51  *New Zealand Ecological Society*

**Summary:** Available from: [http://www.newzealandecology.org/nzje/free\\_issues/NZJcol23\\_1\\_45.pdf](http://www.newzealandecology.org/nzje/free_issues/NZJcol23_1_45.pdf) [Accessed 19 February 2008]

## General information

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[BirdLife International 2004. \*Puffinus yelkouan\*. In: IUCN 2006. 2006 IUCN Red List of Threatened Species](#)

**Summary:** Available from: <http://www.iucnredlist.org/apps/redlist/details/144886/0> [Accessed 12 March 2010]

[BirdLife International 2004. \*Sula dactylatra\*. In: IUCN 2006. 2006 IUCN Red List of Threatened Species](#)

**Summary:** Available from: <http://www.iucnredlist.org/apps/redlist/details/144616/0> [Accessed 12 March 2010]

[BirdLife International 2004. \*Sula leucogaster\*. In: IUCN 2006. 2006 IUCN Red List of Threatened Species](#)

**Summary:** Available from: <http://www.iucnredlist.org/apps/redlist/details/144618/0> [Accessed 12 March 2010]

[BirdLife International 2006. \*Pomarea dimidiata\*. In: IUCN 2007. 2007 IUCN Red List of Threatened Species.](#)

**Summary:** Available from: <http://www.iucnredlist.org/apps/redlist/details/146953/0> [Accessed 12 March 2010]

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**Summary:** Available from: <http://www.birdlife.org/datazone/sites/index.html?action=SitHTMDetails.asp&sid=47&m=0> [Accessed 25 July 2007]

Boisier, P., Rahalison, L., Rasolomaharo, M., Ratsitorahina, M., Mahafaly, M., Razafimahefa, M., Duplantier, J.M., Ratsifasoamanana, L. & Chanteau, S. 2002. Epidemiologic features of four successive annual outbreaks of bubonic plague in Mahajanga, Madagascar. *Emerging Infectious Diseases* 8, 311-316.

Burbidge, A.A., Blyth, J.D., Fuller, P.J., Kendrick, P.G., Stanley, F.J. and Smith, L.E., 2000. The terrestrial vertebrate fauna of the Montebello Islands, Western Australia. *CALMScience* 3(2), 95-107.

Chapuis, J., Bousset, P., & Barnaud, G. 1994. Alien mammals, impact and management in the French Subantarctic Islands. *Biological Conservation*, 67, 97-104.

**Summary:** Cet article présente la situation actuelle et les impacts des populations introduites de mammifères dans les îles subantarctiques françaises. Les moyens de contrôle en place ou planifiés sont également présentés.

[CONABIO. 2008. Sistema de información sobre especies invasoras en México. Especies invasoras - Mamíferos. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. Fecha de acceso.](#)

**Summary:** English:

The species list sheet for the Mexican information system on invasive species currently provides information related to Scientific names, family, group and common names, as well as habitat, status of invasion in Mexico, pathways of introduction and links to other specialised websites. Some of the higher risk species already have a direct link to the alert page. It is important to notice that these lists are constantly being updated, please refer to the main page (<http://www.conabio.gob.mx/invasoras/index.php/Portada>), under the section Novedades for information on updates.

Invasive species - mammals is available from: [http://www.conabio.gob.mx/invasoras/index.php/Especies\\_invasoras\\_-\\_Mam%C3%ADferos](http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Mam%C3%ADferos) [Accessed 30 July 2008]

Spanish:

La lista de especies del Sistema de información sobre especies invasoras de México cuenta actualmente con información acerca de nombre científico, familia, grupo y nombre común, así como el hábitat, estado de la invasión en México, rutas de introducción y ligas a otros sitios especializados. Algunas de las especies de mayor riesgo ya tienen una liga directa a la página de alertas. Es importante resaltar que estas listas se encuentran en constante proceso de actualización, por favor consulte la portada (<http://www.conabio.gob.mx/invasoras/index.php/Portada>), en la sección novedades, para conocer los cambios.

Especies invasoras - Mamíferos is available from:

[http://www.conabio.gob.mx/invasoras/index.php/Especies\\_invasoras\\_-\\_Mam%C3%ADferos](http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Mam%C3%ADferos) [Accessed 30 July 2008]

[Donlan, C. J., Avila-Villegas, H., Ortega, D. B., Biavaschi, N., Bodorff, N., Boyer, R., Comendant, T., Croll, D. A., Cudney-Bueno, R., Galván de la Rosa, R., Howald, G. R., Lozano-Romón, L. F., Morales, C., Morales, O., Morales-Gonzalez, Z., Raimondi, P., Sanchez, J. A., Steller, D., Tershy, B. R., Turk-Boyer, 2002. Black Rat \(\*Rattus rattus\*\) Eradication from the San Jorge Islands, Mexico. Unpublished Report, Island Conservation and Ecology Group. ICEG Technical Report: March 2002](#)

**Summary:** Available from: [http://advancedconservation.org/library/donlan\\_etal\\_2002b.pdf](http://advancedconservation.org/library/donlan_etal_2002b.pdf) [Accessed 25 March 2012]

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Fisher, H. I. and Baldwin, P. H. 1946. War and the birds on Midway Atoll. *Condor* 48: 3-15.

[Gargominy, O. \(Ed.\). 2003. Biodiversité et conservation dans les collectivités françaises d'outre-mer. Comité français pour l'IUCN, Paris.](#)

**Summary:** Synthèse sur la biodiversité des îles françaises d'outre-mer et les enjeux de conservation.

Available from: <http://www.uicn.fr/Biodiversite-outre-mer-2003.html> [Accessed 26 March 2008]

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Harris, M. P. 1970. The biology of an endangered species, the dark-rumped petrel (*Pterodroma phaeopygia*), in the Galapagos Islands. *Condor* 72: 76-84.

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Innes, J. G. 1990. Ship Rat. *The Handbook of New Zealand Mammals*. King, C. M. (ed.) Oxford University Press: 206-225.

**Summary:** A complete reference to the ship rat in New Zealand.

[ITIS \(Integrated Taxonomic Information System\), 2005. Online Database \*Rattus rattus\*](#)

**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.

Available from:

[http://www.cbif.gc.ca/pls/itisca/taxastep?king=every&p\\_action=containing&taxa=Rattus+rattus&p\\_format=&p\\_ifx=plgt&p\\_lang="](http://www.cbif.gc.ca/pls/itisca/taxastep?king=every&p_action=containing&taxa=Rattus+rattus&p_format=&p_ifx=plgt&p_lang=) [Accessed March 2005]

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