GLOBAL INVASIVE SPECIES DATABASE
FULL ACCOUNT FOR: *Rattus norvegicus*

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**System:** Terrestrial

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Phylum</th>
<th>Class</th>
<th>Order</th>
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<tr>
<td>Animalia</td>
<td>Chordata</td>
<td>Mammalia</td>
<td>Rodentia</td>
<td>Muridae</td>
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**Common name**
Rata de noruega (English, Dominican Republic), Wanderratte (German), Norway rat (English), brown rat (English), ratto grigio (Italian), surmolotto (Italian), rotta (Finnish), isorotta (Finnish), rat surmolot (French), rata noruega (Spanish), water rat (English), tikus riul (English, Indonesia), common rat (English), sewer rat (English), pouhawaiki (Maori), ratto di fogna (Italian), topo delle fogne (Italian)

**Synonym**
*Mus norvegicus*, Berkenhout, 1769
*Mus decumanus*, Pallas, 1778
*Mus hibernicus*, Thompson, 1837
*Epimys norvegicus*, Miller, 1912

**Similar species**
*Rattus rattus*, *Rattus exulans*

**Summary**
The Norway rat (*Rattus norvegicus*) is globally widespread and costs primary industry hundreds of millions of dollars per year. It has caused or contributed to the extinction or range reduction of native mammals, birds, reptiles and invertebrates through predation and competition. It restricts the regeneration of many plant species by eating seeds and seedlings, eats food crops and spoils human food stores by urinating and defecating in them. Additional economic damage is caused by chewing through power cables and spreading diseases.

[view this species on IUCN Red List]

**Species Description**
The Norway rat has brown fur on the back with pale grey fur on its belly. The adults normally weigh 150 - 300g, and may reach up to 500g, and are up to 390mm long. They have relatively small ears - which usually do not cover the eyes when pulled forward. The tail is shorter than the head-body length - the opposite is true for the ship rat *R. rattus* (Wittenberg, R. (ed.) 2005). Females have 12 nipples.

**Lifecycle Stages**
On Fregate Island in the Seychelles, juvenile rats first ventured from the den when they were 30-50g in weight (Thorsen *et al.*, 2000; in Innes, 2001).
Habitat Description
Norway rats can be widespread, utilising most habitat types, but they appear to show a preference for wetland habitats. The home range of the Norway rat averaged 5.8ha for males and 5.1ha for females, according to the results from a small study on Kapiti Island off New Zealand (Bramley, 1999; in Innes, 2001). In the UK, male rats had a mean range length of 678m, with that of females being smaller (Macdonald et al., 1999; in Innes, 2001). In Europe, the Norway rat exists primarily in close relationship with humans, but there are also ‘wild’ populations along water edges. The Norway rat is considered to be territorial throughout most of the year, but they will spread when food is scarce, and migrations have been observed (Wittenberg, R. (ed.) 2005). Norway rats rarely climb trees. In the Galapagos Islands, they prefer to move along underground cracks and crevices in the lava rocks (Key and Woods, 1996; in Innes, 2001). From the distribution and recorded reinvasions of Norway rats it appears that they can cross up to 1km of water comfortably, and up to 2km of open water more rarely when conditions are suitable (mudflats, intermediate rocky islets, tidal flow, etc.) (Russell and Clout, 2005).

Reproduction
Placental, sexual. Females are polyestrous and ovulate spontaneously. Breeding largely determined by food availability.
Litter size normally 6 - 11, gestation is 21-24 days, young weaned at about 28 days. Females can be sexually active in the season of their birth.

Nutrition
Omnivorous and opportunistic - including raw or cooked meat and vegetable matter, grains and other seeds and berries as well as roots and a wide variety of vertebrate and invertebrate species. Adults require about 10% of their body weight per day in dry grain, and when on a dry diet they need to drink about 25ml of water. *R. norvegicus* in captivity has been observed to withdraw food to the nest, and sometimes store it there (Barnett and Spencer, 1951; in Campbell et al., 1984).
Norway rats on Breaksea Island, New Zealand, have been reported to eat invertebrates (beetles, spiders, wetas and flies), fish, shellfish, vegetation, and birds. A Japanese study showed that *Rattus norvegicus* is essentially omnivorous, eating plant matter and animal matter (eg. insects) in equal volumes (Yabe, 2004). Norway rats have also been known to attack and kill young rabbits (Bettesworth, 1972; B. Zonfrillo, pers. comm.; M. Imber, pers. obs.; in Imber et al., 2000).

General Impacts
Norway rats are known to restrict the regeneration of many plant species by eating seeds and seedlings. They prey upon most animal species smaller than themselves such as reptiles, small birds, birds eggs and freshwater and intertidal species. Norway rats eat food crops and spoil human food stores by urinating and defecating in them. Additional economic damage is caused by rats chewing through power cables etc. and spreading diseases. Both *R. norvegicus* and *Rattus rattus* 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). Wei Hong et al. (1999) provide useful information regarding the detection of rodent species using different trapping methods and bait, Dilks and Towns (2002) published by New Zealand’s Department of Conservation discusses how to detect and respond to rodent invasions on islands.

Physical: Trapping is often used on a local scale, however it generally fails to remove all individuals, as trap-shy animals can survive and repopulate the island (DoC, 2004).

Chemical: Use of anticoagulant poisons is the most common method of control. On islands, eradication has been achieved by the use of poisons. However, strict quarantine is required to prevent further spread of this species to additional islands. One of the world’s largest successful eradication operations was on the 3,100 hectare Langara Island in British Columbia, Canada. The eradication campaign was begun (after preparation and trials) in July 1995 and the island was declared free of rats in May 1997 (Kaiser et al., 1997). Another example of a successful rat eradication was on Kapiti Island, New Zealand (1970 ha) where “second-generation” anticoagulant poisons have been used (Empson and Miskelly, 1999). The world’s largest rat eradication project to date is on Campbell Island (11,300 ha), where eradication was declared in 2003.

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) discussed 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).

Pathway

*Rattus norvegicus* can be transported in either bulk or loose equipment or simply by stowing away on a vessel. Their habit of living near wharves increases the chances of this happening.

Principal source:

Compiler: IUCN SSC Invasive Species Specialist Group

Updates with support from the Overseas Territories Environmental Programme (OTEP) project XOT603, a joint project with the Cayman Islands Government - Department of Environment
Review: Pete McClelland, Dept. of Conservation, Invercargill, New Zealand

Publication date: 2011-03-14

ALIEN RANGE

[60] NEW ZEALAND [1] NIUE
[13] UNITED STATES [1] UNITED STATES MINOR OUTLYING ISLANDS

Red List assessed species 67: EX = 7; CR = 13; EN = 15; VU = 20; NT = 10; LC = 2;

Acrocephalus rimatarae VU
Afroablepharus africana VU
Anas eatoni VU
Anas nesiotis EN
Aphrastura masafuerae CR
Acrocephalus rodericanus EN
Electroenas rodericana EX
Anas georgica georgica LC
Anthus antarcticus NT
Aplonis mavornata EX
Apteryx oweni  NT
Charadrius sanctaeheleinae  CR
Coracina newtoni  CR
Cyanolimnas cerverai  CR
Cyanoramphus zealandicus  EX
Eretmochelys imbricata  CR
Fermina cerverai  EN
Fratercula arctica  LC
Gallirallus australis  VU
Himantopus novaezelandiae  CR
Larus bulleri  EN
Megapodius lapereuse  EN
Oligoryzomys victus  EX
Oligosoma fallai  VU
Oreomythis baardi  CR
Phalacrocorax featherstoni  EN
Phoebetria palpebrata  NT
Procellaria cinerea  NT
Pseudobulweria macgillivrayi  CR
Pterodroma cervicavis  VU
Pterodroma longirostris  VU
Pterodroma sandwichensis  VU
Puffinus bulleri  VU
Puffinus griseus  NT
Puffinus newelli  EN
Sterna albostriata  EN
Tropodytes cobbii  VU
Vini kuhlii  EN
Zosterops modestus  EN
Arvicola sapidus  VU
Copsychus sechellarum  EN
Coracina typica  VU
Cyanoramphus ulietanus  EX
Cyclura pinguis  CR
Eudyptes chrysocome  VU
Foudia sechellarum  NT
FULICA ALAI  VU
Haematopus chathamensis  EN
Hypsipetes olivaceus  VU
Leioplosma telfairii  VU
Mergus australis  EX
Oligosoma acuminatum  NT
Oligosoma otagense  EN
Phalacrocorax campbelli  VU
Philesturnus carunculatus  NT
Procellaria aequinoctialis  VU
Prosobonia leucoptera  EX
Pterodroma cahow  EN
Pterodroma externa  VU
Pterodroma phaeopygia  CR
Puffinus auricularis  CR
Puffinus creatopus  VU
Puffinus mauretanicus  CR
Puffinus velkouan  NT
Thinornis novaeseelandiae  EN
Turdus olivaceofuscus  NT
Zosterops chloronothus  CR

BIBLIOGRAPHY

76 references found for Rattus norvegicus

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


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


**Summary:** Eradication case study in *Turning the tide: the eradication of invasive species*. 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://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1730&context=icwdm_usdanwrc](http://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1730&context=icwdm_usdanwrc) [Accessed 8 May 2010]


**Summary:** 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.


**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]


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Pacific Invasives Initiative (PII). 2006. Eradicating invasive species from Kayangel Atoll, Palau
Poncet, S. 2011. Falkland Islands Rat Eradication Register Last Updated 20 October 2011
Summary: An annotated register of rat eradications carried out in the Falkland Islands with notes on methods, operation notes, pre-baiting survey notes, post-operation checks, causes of failure etc.
South Georgia Heritage Trust, 11 December 2010. Environmental Impact Assessment for the Eradication of Rodents from the Island of South Georgia
Summary: Available from: http://www.sght.org/sites/default/files/SGHR%20project%20EI%2011%20Dec%202010%20MASTER.pdf [Accessed 14 March 2011]

South Georgia Heritage Trust, 15 December 2010. Initial Environmental Evaluation for the eradication of rodents from Thatcher Peninsula, South Georgia
South Georgia Heritage Trust, 4 December 2010. Operational Plan for the Eradication of Rodents from South Georgia: Phase 1
South Georgia Heritage Trust, 6 December 2009. Initial Environmental Evaluation for the eradication of rodents from the Mercer baiting zone, South Georgia
South Georgia Heritage Trust, 8 December 2010. Initial Environmental Evaluation for the eradication of rodents from Saddle Island, South Georgia
South Georgia Heritage Trust, 9 December 2009. Initial Environmental Evaluation for the eradication of rodents from Greene Peninsula, South Georgia
Summary: Eradication case study In Turning the tide: the eradication of invasive species.
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: Eradication case study in Turning the tide: the eradication of invasive species.


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]


Summary: Eradication case study in New Zealand: Norway rats and house mice from Motuihe Island.


Summary: Alien mammal species and their impacts at French Subantarctic islands.


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


Summary: English:
The species list sheet for the Mexican information system on invasive species currently provides information related to Scientific names, family, 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_invazoras_-_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 cómo ha sido la introducción 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 recordar 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_invazoras_-_Mam%C3%ADferos [Accessed 30 July 2008]


Summary: Consequences to the biodiversity of New Caledonia of the introduction of plant and animal species.

ITIS (Integrated Taxonomic Information System), 2005. Online Database Rattus norvegicus

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:


Lecorre, com pers, 2007

Summary: Personnal communication with Matthieu Lecorre, from the University of La Réunion.


Summary: Synth?se g?n?rale sur la faune terrestre de Mayotte


Moors P. M. 1985. Norway Rats (Rattus norvegicus) on the Noises and Motukawao Islands, Hauraki Gulf, New Zealand.


Summary: Available from:


Urtizberea, pers. comm., 2007

Summary: Personal communication with Frank Urtizberea, from the Direction de l Agriculture et de la For?t.