Rattus norvegicus

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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</tbody>
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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 polyestrus 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). WeiHong 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

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<tr>
<td>[1] Isle of Man</td>
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<td>[1] Niue</td>
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<td>[1] Seychelles</td>
<td>[1] South Georgia and the South Sandwich Islands</td>
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<td>[1] Trinidad and Tobago</td>
<td>[1] Turks and Caicos Islands</td>
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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
- Electroenas rudericanus EX
- Anas georgica georgica LC
- Anthus antarcticus NT
- Aplonis mavornata EX
Full Account for: Rattus norvegicus

Apteryx owenii | NT
Charadrius sanctaeheleae | CR
Coracina newtoni | CR
Cyanolimnas cerverai | CR
Cyanorhamphus zealandicus | EX
Erethmocheilus imbricata | CR
Ferminia cerverai | EN
Fratercula arctica | LC
Gallirallus australis | VU
Himantopus novaezelandiae | CR
Larus bulleri | EN
Megapodius lapereous | EN
Oligoryzomys victus | EX
Oligosoma fallai | VU
Oreomysis baudi | CR
Phalaropus dubius | EN
Phoebetria palpebrata | NT
Procellaria cinerea | NT
Pseudobulweria macgilivrayi | CR
Pterodroma cervicalis | VU
Pterodroma longirostris | VU
Pterodroma sandwichensis | VU
Puffinus bulleri | VU
Puffinus griseus | NT
Puffinus newelli | EN
Sterna albostriata | EN
Trogodytes cobbii | VU
Vini kuhlii | EN
Zosterops modestus | EN

Arvicola sapidus | VU
Copsychus sechellarum | EN
Coracina typica | VU
Cyanorhamphus uiletanus | 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 acisnas | NT
Oligosoma otogenese | EN
Phalacrocorax campbelli | VU
Philasternus carunculatus | NT
Procellaria aequinoctalis | VU
Prosobonia leucopera | EX
Pterodroma cahow | EN
Pterodroma externa | VU
Pterodroma phaeopygia | CR
Puffinus auricularis | CR
Puffinus creatopus | VU
Puffinus maureticus | CR
Puffinus velkoian | 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.

BirdLife Malta Undated. The Yelkouan Shearwater Project


GLOBAL INVASIVE SPECIES DATABASE
FULL ACCOUNT FOR: Rattus norvegicus


Summary: Available from: 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.


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


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


Pacific Invasives Initiative (PPI). 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%20EIA%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.


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]


General information


Summary: Including the impact of predation by rats.


La lista de especies del Sistema de informaci?n sobre especies invasoras en M?xico cuenta actualmente con informaci?n acerca de nombre cient?fico, familia, grupo y nombre com?.n, as? como h?bitat, estado de la invas?n en M?xico, rutas de introducci?n, y ligas a otros sitios especializados. Algunas de las especies de mayor riesgo ya tienen una liga directa a la p?gina de alertas. Es importante rese?ar que estas listas se encuentran en constante proceso de actualizaci?n, por favor consulte la portada (http://www.conabio.gob.mx/invasoras/index.php/Portada), en la secci?n novedades, para conocer los cambios.


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.


Summary: Pag. 9


Urtizberea, pers.com., 2007

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