GLOBAL INVASIVE SPECIES DATABASE

FULL ACCOUNT FOR: ***Rattus norvegicus***

Rattus norvegicus 正體中文

System: Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Mammalia	Rodentia	Muridae

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). 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, eradications have 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. \r\n
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
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ALIEN RANGE

[1] AMERICAN SAMOA
[1] AUSTRALIA
[1] BELGIUM
[1] BRAZIL
[1] ANGUILLA
[1] BAHAMAS
[1] BERMUDA
[6] CANADA

[3] CAYMAN ISLANDS
[1] CHINA
[1] CURACAO
[1] DOMINICA
[2] ECUADOR
[7] FIJI
[8] FRENCH POLYNESIA
[1] GUADELOUPE
[1] ISLE OF MAN
[1] JAMAICA
[2] KIRIBATI
[4] MARSHALL ISLANDS
[2] MAURITIUS
[2] MEXICO
[1] MONTSERRAT
[60] NEW ZEALAND
[2] NORTHERN MARIANA ISLANDS
[1] PERU
[1] REUNION
[1] SAINT LUCIA
[1] SAMOA
[1] SEYCHELLES
[1] SWITZERLAND
[1] TRINIDAD AND TOBAGO
[1] TUVALU
[13] UNITED STATES
[3] VANUATU
[1] VIRGIN ISLANDS, U.S.
[1] CHILE
[4] COOK ISLANDS
[1] DENMARK
[1] DOMINICAN REPUBLIC
[5] FALKLAND ISLANDS (MALVINAS)
[14] FRANCE
[4] FRENCH SOUTHERN TERRITORIES
[1] GUAM
[1] ISRAEL
[1] JAPAN
[2] MALTA
[1] MARTINIQUE
[1] MAYOTTE
[2] MICRONESIA, FEDERATED STATES OF
[3] NEW CALEDONIA
[1] NIUE
[5] PALAU
[1] PORTUGAL
[1] SAINT HELENA
[1] SAINT PIERRE AND MIQUELON
[1] SAO TOME AND PRINCIPE
[1] SOUTH GEORGIA AND THE SOUTH SANDWICH ISLANDS
[1] TONGA
[1] TURKS AND CAICOS ISLANDS
[7] UNITED KINGDOM
[1] UNITED STATES MINOR OUTLYING ISLANDS
[1] VIRGIN ISLANDS, BRITISH
[3] WALLIS AND FUTUNA

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**
Apteryx owenii **NT**
Charadrius sanctaehelenae **CR**
Coracina newtoni **CR**
Cyanolimnas cerverai **CR**
Cyanoramphus zealandicus **EX**
Eretmochelys imbricata **CR**
Ferminia cerverai **EN**
Fratercula arctica **LC**
Gallirallus australis **VU**
Himantopus novaezelandiae **CR**
Larus bulleri **EN**
Megapodius laperouse **EN**
Oligoryzomys victus **EX**
Oligosoma fallai **VU**
Oreomystis bairdi **CR**
Phalacrocorax featherstoni **EN**
Phoebetria palpebrata **NT**
Procellaria cinerea **NT**
Acrocephalus rodericanus **EN**
Alectroenas rodericana **EX**
Anas georgica georgica **LC**
Anthus antarcticus **NT**
Aplonis mavornata **EX**
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**
Leiolopisma telfairii **VU**
Mergus australis **EX**
Oligosoma acrinasum **NT**
Oligosoma otagense **EN**
Phalacrocorax campbelli **VU**
Philesturnus carunculatus **NT**
Procellaria aequinoctialis **VU**
Prosobonia leucoptera **EX**

Pseudobulweria macgillivrayi **CR**
Pterodroma cervicalis **VU**
Pterodroma longirostris **VU**
Pterodroma sandwichensis **VU**
Puffinus bulleri **VU**
Puffinus griseus **NT**
Puffinus newelli **EN**
Sterna albostriata **EN**
Troglodytes cobbi **VU**
Vini kuhlii **EN**
Zosterops modestus **EN**
Pterodroma cahow **EN**
Pterodroma externa **VU**
Pterodroma phaeopygia **CR**
Puffinus auricularis **CR**
Puffinus creatopus **VU**
Puffinus mauretanicus **CR**
Puffinus yelkouan **NT**
Thinornis novaeseelandiae **EN**
Turdus olivaceofuscus **NT**
Zosterops chloronothus **CR**

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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.

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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.
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Summary: Including the impact of predation by rats.
Chapuis, J., Bouss□s, P., & Barnaud, G. 1994. Alien mammals, impact and management in the French Subantartic Islands. Biological Conservation, 67, 97-104.
Summary: Cet article pr□sente la situation actuelle et les impacts des populations introduites de mammif□res dans les □les subantarctiques fran□aises. Les moyens de contr□le en place ou planifi□s sont □galement pr□sent□s.

CONABIO. 2008. Sistema de informaci□n sobre especies invasoras en M□xico. Especies invasoras - Mam□feros. Comisi□n 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 [Accessed 30 July 2008]
Spanish:
La lista de especies del Sistema de informaci□n sobre especies invasoras de m□xico cuenta actualmente con informaci□n aceca de nombre cient□fico, familia, grupo y nombre com□n, as□ como h□bitat, estado de la invasi□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 resaltar 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.
Especies invasoras - Mam□feros is available from:
http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Mam%C3%ADferos [Accessed 30 July 2008]
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Gargominy, O., Bouchet, P., Pascal, M., Jaffre, T. and Tourneu, J. C. 1996. Consequences des introductions d'especes animals et vegetales sur la biodiversite en Nouvelle-Caledonie. Rev. Ecol. (Terre Vie) 51: 375-401.
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:
http://www.cbif.gc.ca/pls/itisca/taxastep?king=every&p_action=containing&taxa=Rattus+norvegicus&p_format=&p_ifx=plglt&p_lang= [Accessed March 2005]
Lattanzio, R. M. and Chapman, J. A. 1980. Reproductive and physiological cycles in an island population of Norway rats. Bulletin of the Chicago Academy of Sciences 12: 1-68.
Lecorre, com pers, 2007
Summary: Personnal communication with Matthieu Lecorre, from the University of La R□union.
Lorvelec, O., Pascal, M., Delloue, X., Chapuis, J.L. 2007. Les mammif□res terrestres non volants des Antilles fran□aises et l□introduction r□cente d□un □cureil. Rev.Ecol. (Terre Vie), 62, 295-314
Summary: Bilan des introductions des mamif□res terrestres dans les Antilles fran□aises et analyse de leurs impacts.
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Summary: Synth□se g□n□rale sur la faune terrestre de Mayotte
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