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
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

Pubblication date: 2011-03-14

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**

BIBLIOGRAPHY

76 references found for **Rattus norvegicus**

Managment information

Atkinson, I. A. E. and Atkinson, T. J. 2000. Land vertebrates as invasive species on islands served by the South Pacific Regional Environment Programme. In: Invasive Species in the Pacific: A Technical Review and Draft Regional Strategy. South Pacific Regional Environment Programme, Samoa: 19-84.

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.

Bell, B.D. 2002. The eradication of alien mammals from five offshore islands, Mauritius, Indian Ocean. In *Turning the tide: the eradication of invasive species*: 40-45. 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.

BirdLife Malta Undated. The Yelkouan Shearwater Project

Summary: Available from: http://lifeshearwaterproject.org.mt/en/project/ [Accessed 25 July 2007]

Bomford, M., 2003. Risk Assessment for the Import and Keeping of Exotic Vertebrates in Australia. Bureau of Rural Sciences, Canberra.

Summary: Available from: http://www.feral.org.au/wp-content/uploads/2010/03/PC12803.pdf [Accessed August 19 2010]

Bourne, John B., 2006. Norway Rat Exclusion in Alberta. Alberta Agriculture and Food.

Cossios E. Daniel, 2010. Vertebrados naturalizados en el Per: 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]

Cromarty, P. L.; K. G Broome, A. Cox, R. A. Empson, W. M. Hutchinson, and I. McFadden., 2002. Eradication planning for invasive alien animal species on islands- the approach developed by the New Zealand Department of Conservation. In *Turning the tide: the eradication of invasive species*: 85-91. 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.

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): 71241.

Empson, R. A. and Miskelly, C. M. 1999. The risks, costs and benefits of using brodifacoum to eradicate rats from Kapiti Island, New Zealand. New Zealand Journal of Ecology 23: 241-254.

Hill, M. J.; T. Vel, N. J. Shah., 2003. The morphology, distribution and conservation implications of introduced rats, *Rattus* spp. in the granitic Seychelles. African Journal of Ecology 41 (2) , 179186

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.

Kaiser, G. W., Taylor, R. H., Buck, P. D., Elliott, J. E., Howald, G. R. and Drever, M. C. (1997) The Langara Island Seabird Habitat Recovery Project: Eradication of Norway Rats - 1993-1997. Technical Report Series No. 304, Canadian Wildlife Service, Pacific and Yukon Region, British Columbia.

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.

McClelland, P. J., 2002. Preparation for the eradication of Norway rats (*Rattus norvegicus*) from Campbell Island, New Zealand. 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.
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.
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 [Accessed 19 February 2008]
Miskelly, C and H. Robertson., 2002. Response of forest birds to rat eradication on Kapiti Island, New Zealand. 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.
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.
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]
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.
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]
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
Summary: Available from: http://www.sght.org/sites/default/files/Thatcher%20IEE%2C%20version%202.doc [Accessed 14 March 2011]
South Georgia Heritage Trust, 4 December 2010. Operational Plan for the Eradication of Rodents from South Georgia: Phase 1
Summary: Available from: http://www.sght.org/sites/default/files/SGHR%20Operational%20Plan%2004%20December%202010%20MASTER.pdf [Accessed 14 March 2011]
South Georgia Heritage Trust, 6 December 2009. Initial Environmental Evaluation for the eradication of rodents from the Mercer baiting zone, South Georgia
Summary: Available from: http://www.sght.org/sites/default/files/Mercer%20IEE%20final.doc [Accessed 14 March 2011]
South Georgia Heritage Trust, 8 December 2010. Initial Environmental Evaluation for the eradication of rodents from Saddle Island, South Georgia
Summary: Available from: http://www.sght.org/sites/default/files/Saddle%20IEE%20v1.doc [Accessed 14 March 2011]
South Georgia Heritage Trust, 9 December 2009. Initial Environmental Evaluation for the eradication of rodents from Greene Peninsula, South Georgia
Summary: Available from: http://www.sght.org/sites/default/files/Greene%20IEE%20final.doc [Accessed 14 March 2011]
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]
Taylor R. H., Kaiser G. W. & Drever M. C. 2000. Eradication of Norway rats for recovery of seabird habitat on Langara Island, British Columbia. Restoration Ecology 8: 151 - 160.
Taylor R. H. & Thomas B. W. 1989. Eradication of Norway rats (*Rattus norvegicus*) from Hawea island, Fjordland, using brodifaceum. New Zealand Journal of Ecology 12: 23 - 32.
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 [Accessed 13 February 2008]

Thomas and Taylor, 2002. A history of ground-based techniques developed in New Zealand, 1959-1993. In *Turning the tide: the eradication of invasive species*: 301-310. 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.
Thorsen, M.; R. Shorten, R. Lucking and V. Lucking., 2000. Norway rats (*Rattus norvegicus*) on Fr�gate Island, Seychelles: the invasion; subsequent eradication attempts and implications for the island s fauna. Biological Conservation Volume 96, Issue 2, December 2000, Pages 133-138
Tompkins J. 2001. Eradication of *Rattus norvegicus* from Seabird habitat in Canada. CWS, British Columbia, Canada.
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. Rdum tal-Madonna rat control project, December 2006 - March 2007, Final report. Unpublished report to BirdLife Malta & RSPB, 28pp.
Veitch, C. R., 2002a. Eradication of Norway rats (*Rattus norvegicus*) and house mouse (*Mus musculus*) from Motuihe Island, New Zealand In *Turning the tide: the eradication of invasive species:* 381-388. 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.
Veitch, C. R., 2002c. Eradication of Norway rats (*Rattus norvegicus*) and house mouse (*Mus musculus*) from Browns Island (Motukorea), Hauraki Gulf, New Zealand. In *Turning the tide: the eradication of invasive species*: 381-388. 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.
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/NZJEcol23_1_45.pdf [Accessed 19 February 2008]
West., C. J., 2002. Eradication of alien plants on Raoul Island, Kermadec Islands, New Zealand. In *Turning the tide: the eradication of invasive species*: 381-388. Veitch, C.R. and Clout, M.N.(eds). IUCN SSC Invasive Species Specialist Group. IUCN. Gland.
Summary: Eradication case study in Turning the tide: the eradication of invasive species.
Wittenberg, R. (ed.) 2005. An inventory of alien species and their threat to biodiversity and economy in Switzerland. CABI Bioscience Switzerland Centre report to the Swiss Agency for Environment, Forests and Landscape
Summary: Available from: http://www.nobanis.org/files/invasives%20in%20CH.pdf [Accessed 29 May 2008]
Zeppelini, Douglas; Rita Mascarenhas & Guntram G. Meier, 2007. Rat Eradication as Part of a Hawksbill Turtle (*Eretmochelys imbricata*) Conservation Program in an Urban Area in Cabedelo, Para©ba State, Brazil. Marine Turtle Newsletter No. 117, 2007 - Page 5 and 6
Summary: Available from: http://www.seaturtle.org/mtn/archives/mtn117/ [Accessed 18 February 2008] Available from: http://www.seaturtle.org/mtn/PDF/MTN117.pdf [Accessed 3 August 2007]

General information

Atkinson, I. A. E. 1985. The spread of commensal species of Rattus to oceanic islands and their effects on island avifaunas. In Moors, P. J. (ed.) Conservation of Island Birds. ICBP Technical Publication No.3: 35-81.
Bertram D. F. 1995. The role of introdued rats and commercial fishing in the decline of Ancient Murrelets on Langara Island, British Columbia. Conservation Biology 9: 865 - 872.
Bertram D. F. & Nagorsen D. W. 1995. Introduced rats on Queen Charlotte Island: Implications for seabird conservation. Canadian Field-Naturalist 109: 6 - 10.
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 2007. BirdLife s online World Bird Database: the site for bird conservation. Version 2.1. Cambridge, UK: BirdLife International.
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.
Brown, P. E. 1949. The breeding of avocets in England, 1948. British Birds 42: 2-13.
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]
Drever M. C. & Harestad A. . 1998. Diets of Norway rats (*Rattus norvegicus*) on Langara Island, Queen Charlotte Islands, British Columbia: Implications for conservation of breeding seabirds. Canadian Field-Naturalist 112: 676 - 683.
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.
Lorvelec, O., Pascal, M., & Pavis, C. 2001. Inventaire et statut des Mammif□res des Antilles fran□aises (hors Chiropt□res et C□tac□s). In Rapport n□ 27 de l Association pour l Etude et la Protection des Vert□br□s et V□g□taux des Petites Antilles, Petit-Bourg, Guadeloupe.
Summary: Article de synth□se sur les mammif□res (hors chiropt□res et c□tac□s) des Antilles fran□aises. L origine des esp□ces introduites et leurs impacts av□r□s ou potentiels sont discut□s.
Available from: http://www.fnh.org/francais/fnh/uicn/pdf/biodiv_mammiferes_antilles.pdf [Accessed 9 April 2008]
Louette M. 1999. La Faune terrestre de Mayotte - Mus□e Royal de l Afrique Centrale, 247 p.
Summary: Synth□se g□n□rale sur la faune terrestre de Mayotte
Mendelssohn H & Y Yom-Tov, 1987. Eds. Vol 7: Mammals. Plants and Animals of the Land of Israel. Ministry of Defence/The Publishing House, Society for the Protection of Nature in Israel.
Meyer, J.-Y. , Butaud, J.F. 2007. Rats as transformers of native forests in the islands of French Polynesia (South Pacific). In Rats, Humans, and their impacts on islands : integrating historical and contempory ecology. University of Hawai□i. Conference 27-31 March 2007. Communication orale.
Meyer, J.-Y. & Picot, F. 2001. Achatines attack! The impact of Giant African land snails on rare endemic plants in La R□union Island (Mascarene Is., Indian Ocean). Aliens, 14, 13-14.
Summary: Available from: http://www.issg.org/pdf/aliens_newsletters/A14.pdf [Accessed 10 November 2009]
Micol, T. & Jouventin, P. 1995. Restoration of Amsterdam Island, South Indian Ocean, following control of feral cattle. Biol. Conserv., 72, 199-206.
Moors, P. J. 1990. Norway rat. In King, C. M. (ed.) The Handbook of New Zealand Mammals. Oxford University Press, Auckland: 192-206.
Moors P. M. 1985. Norway Rats (*Rattus norvegicus*) on the Noises and Motukawao Islands, Hauraki Gulf, New Zaland. New Zealand Journal of Ecology 8: 37 - 54.
Mus□um national d Histoire naturelle [Ed]. 2003-2006 . *Rattus norvegicus*. Inventaire national du Patrimoine naturel, site Web : http://inpn.mnhn.fr. Document t□l□charg□ le 28 mars 2008 .
Summary: Available from:
http://inpn.mnhn.fr/isb/servlet/ISBServlet?action=Espece&typeAction=10&pageReturn=ficheEspeceDescription.jsp&numero_taxon=61585 [Accessed March 2008]
Pascal, M., Barr□, N., De Garine-Wichatitsky, Lorvelec, O., Fr□tey, T., Brescia, F., Jourdan, H. 2006. Les peuplements n□o-cal□doniens de vert□b□br□s : invasions, disparitions. Pp 111-162, in M.-L. Beauvais *et al.*, : Les esp□ces envahissantes dans l□archipel n□o-cal□donien, Paris, IRD □ditions, 260 p.+ c□d□rom
Summary: Synth□se des introductions d esp□ces de vert□br□s en Nouvelle-Cal□donie et □valuation de leurs impacts.
Picot F. 2005. - Plan de conservation du Mazambron marron, *Aloe macra* Haw., Aloe section Lomatophyllum Rowley. CBNM, non publi□

Probst J.-M. 1997. Animaux de la R&#65533;union. Azal&#65533;es Editions. 168 pp.
Pye, T. and Bonner, W. N. 1980. Feral brown rats, *Rattus norvegicus*, in South Georgia (South Atlantic Ocean). Journal of Zoology, London 192: 237-255.
Urtizberea, pers.comm., 2007
Summary: Personal communication with Frank Urtizberea, from the Direction de l Agriculture et de la For&#65533;t .