**Rodenticide Information – Annotated Bibliography**

Broome, K., A. Fairweather, and P. Fisher. 2010. Coumatetralyl a review of current knowledge. Department of Conservation Pesticide Information Reviews. DOC Research and Development Division, Hamilton, New Zealand.

* Not directly cited for rodenticide table
* This document contains a review done by the New Zealand DOC on current knowledge of coumatetralyl

Brown, R. A., A. R. Hardy, P. W. Greig-Smith, and P. J. Edwards. 1988. Assessing the impact of rodenticides on the environment. Bulletin OEPP/EPPO Bulletin **18**:283-292.

* Not directly cited for rodenticide table
* This document contains some reference to various rodenticides. However, the paper’s primary focus is on the steps that should be taken to assess the impact of rodenticides on the environment

Colvin, B. A., P. L. Hegdal, and W. B. Jackson. 1988. Review of non-target hazards associated with rodenticide use in the USA. Bulletin OEPP/EPPO Bulletin **18**:301-308.

* Not directly cited for rodenticide table
* This document provides important information and insight into the effects of rodenticides on non-target species. The authors discuss primary and secondary poisoning, but do not assign hazard levels for rodenticides. This document has a lot of information that may be useful for corroborating other sources

DOC. 2011. Sodium fluoracetate a review of current knowledge. Department of Conservatio Pesticide Information Reviews. DOC Research and Development Division, Hamilston, New Zealand.

* Cited for rodenticide table
* This is a report on the use and effects of sodium fluroacetate (1080). Has a good amount of useful info that reiterates other sources. Information on the bait form (i.e. pellet) was taken from this document.

DOC. 2010. Coumatetralyl a review of current knowledge. Department of Conservation Pesticide Information Reviews. DOC Research and Development Division, Hamilton, New Zealand.

* Cited for rodenticide table
* This is a report on the use and effects of coumatetralyl. Has a good amount of useful information. Information on the bait form (i.e. pellet), pesticide type (first gen anti-coag), and risk to invertebrates was taken from this document.

DOC. 2010. Diphacinone a review of current knowledge. Department of Conservation Pesticide Information Reviews. DOC Research and Development Group, Hamilton, New Zealand.

* Not directly cited in rodenticide table
* This is a report on the use and effects of Diphacinone. Has a good amount of useful information.

DOC. 2010. Pindone a review of current knowledge. Department of Conservation Pesticide Information Reviews. DOC Research and Development Division, Hamislton, New Zealand.

* Cited for rodenticide table
* This is a report on the use and effects of pindone. Has a good amount of useful information. Pesticide type (first gen anti-coag) was taken from this document.

Domyownpestcontrol.com. 2011. [www.domyownpestcontrol.com](http://www.domyownpestcontrol.com).

* Cited for rodenticide table
* This is a commercial U.S. website that sales various products including rodenticides. A search was made for pelletized rodenticide products. Products containing zinc phosphide, bromethalin, cholecalciferol, bromediolone, and difethialone are available on this website.

Donlan, C. J., G. R. Howald, B. R. Tershey, and D. A. Croll. 2003. Evaluating alternative rodenticides for island conservation: roof rat eradication from the San Jorge Island, Mexico. Biological Conservation **114**:29-34.

* Cited for rodenticide table
* This paper discusses the successful eradication of rats from three islands in Mexico using three different rodenticides: brodifacoum, cholecalciferol, and diphacinone. Each rodenticide was effective in eradicating rats. The islands were small and eradication was completed using bait stations.
* Cholecalciferol is sub acute

Eason, C., R. Henders, S. Hix, D. MacMorran, A. Miller, E. Murphy, J. Ross, and S. Ogilvie. 2010. Alternatives to brodifacoum and 1080 for possum and rodent control - how and why? New Zealand Journal of Zoology **37**:175-183.

* Not directly cited for rodenticide table.
* This document provides information on how rodenticides are process and move through the environment. However, the overall focus is more on control so the authors are primarly looking for alternatives to brodifacoum in the sense that brodifacoum is not good for long-term control and repeated applications. Could be useful to corroborate secondary poisoning hazards.

Eason, C. T., and S. Ogilvie. 2009. A re-evaluation of potential rodenticides for aerial control of rodents. DOC research & development series. Department of Conservation, Wellington, New Zealand.

* Cited for rodenticide table
* The authors evaluate the potential rodenticides for use in aerial control of rodents in New Zealand. The document provided LD 50 information for zinc phosphide and strychnine; was used to determine the non-target hazard to birds for zinc phosphide, strychnine, and bromethalin; was used to determine non-target hazard to mammals for zinc phosphide, strychnine, cholecalciferol, bromethalin, diphacinone, and coumatetralyl; and determined that pindone was a less effective rodenticide than diphacininone.

Eisler, R. 1995. Sodium monofluoroacetate (1080) hazards to fish, wildlife, and invertebrates: a synoptic review. Biological Report **27**:52.

* Cited for rodenticide table
* The author provides an in-depth review of the uses, actions, and effects of 1080. Hazards to birds, invertebrates, amphibians, and reptiles are discussed. LD50 values for a multitude of species are provided, including house mouse and black rat.

Erickson, W., and D. Urban. 2004. Potential risks of nine rodenticides to birds and nontarget mammals: a comparative approach. United states Environmental Protection Agency, Office of Pesticides Programs Environemtnal Fate and Effects Division, Washington, D.C.

* Cited for rodenticide table
* Really good source with info on risks to birds and mammals as well as ld50s for 9 US registered rodenticides (however ld50s were not cited from this document). NOTE: good table summarizing risks on page 108
* This document outlines the non-target risks of nine rodenticides to birds and mammals. The document summarizes the effects and modes of action of the pesticides through both primary and secondary exposure. The effects and likelihood of exposure are considered to rank each rodenticide in low medium or high risk. The nine toxicants covered by this document are: brodifacoum, difethialone, bromadiolone, diphacinone, chlorophacinone, warfarin, bromethalin,zinc phosphide and cholecalciferol.

Fishel, F. M. 2005. Pesticide toxicity profile: coumarin and indandione rodenticides. University of Florida Institute of Food and Agricultural Sciences Extension.

* Not directly cited for rodenticide table
* Provides LD50s for five rodenticides licensed in the USA, but is mostly designed to promote general awareness and provide basic information.

Fisher, P. 2005. Review of house mouse (*Mus musculus*) susceptibility to anticoagulant poisons. DOC Science Internal Series 198. Department of Conservation, Wellington, New Zealand.

* Cited for rodenticide table
* The author provides a literature review of house mouse susceptibility to anticoagulant poisons. The LD50 for other rodent species was provided when available. Rodenticides discussed are: pindone, diphacinone, chlorphacinone, warfarin, coumatetralyl, brodifacoum, bromadiolone, flocoumafen, difenacoum, and difethialone.

Fisher, P., C. O'Connor, G. Wright, and C. T. Eason. 2004. Anticoagulant residues in rats and secondary non-target risk. DOC Science Internal Series 188. Department of Conservation, Wellington, New Zealand.

* Cited for rodenticide table
* The authors analyzed the secondary poisoning risk presented by five anticoagulant pesticides: brodifacoum, coumetetralyl, warfarin, pindone, and diphacinone. The occurrence of residues in the livers of rats was measured for three consumption scenarios and used as a basis for an assessment of the secondary poisoning risk to predators and scavengers.
* Used to verify 1st and 2nd gen anti-coagulants

Greaves, J. H., C. G. J. Richards, and A. P. Buckle. 1988. An investigation of the parameters of anticoagulant treatment efficiency. Bulletin OEPP/EPPO Bulletin **18**:211-221.

* Not directly cited for rodenticide table
* Provides some LD50 information, but mostly focuses on determining effective baiting strategies for rodent control.

Griffiths, R. Personal Communication. 10/11/2011.

* Griffiths is a program director at Island Conservation and has expansive experience and knowledge in rodent eradications.
* Made a determination of the efficacy of strychnine and flocoumafen based on Mackay et al. 2007 and personal experience

Jackson, W. B., S. R. Spaulding, R. B. L. Van Lier, and B. A. Dreikorn. 1982. Bromethalin - a promising new rodenticide in R. E. Marsh, editor. Proceedings of the Tenth Vertebrate Pest Conference. University of California, Davis.

* Cited for rodenticide table
* The authors examine the efficacy of bromethalin through various feeding studies. The LD50 for mice and rats is reported. The authors conclude that bromethalin is an effective rodenticide that poses low risk to non-targets if properly used.

Jing-Hui, L., and R. E. Marsh. 1988. LD50 determination of zinc phosphide toxicity for house mice and albino laboratory mice. Pages 91-94 in A. C. Crabb, and R. E. Marsh, editors. Proceedings of the Thirteenth Vetebrate Pest Conference. University of California, Davis.

* Cited for rodenticide table
* The author orally exposed house mice and albino laboratory mice to zinc phosphide in order to determine the LD50. The LD50 of wild house mice was found to be 32.68 mg/kg

Kaukeinen, D. 1982. A review of the secondary poisoning hazard potential to wildlife from the use of anticoagulant rodenticides in R. E. Marsh, editor. Proceedings of the Tenth Vertebrate Pest Conference. University of California, Davis.

* Not cited for rodenticide table
* This document reviews the actions and effects of anticoagulant rodenticides. It determines that no serious effects should be expected when used properly. Does not focus on eradication use. Does mention that effects and susceptibility to poisoning can vary greatly even amongst different varieties of the same species.

Mackay, J. W. B., J. C. Russell, and E. C. Murphy. 2007. Eradicating house mice from islands: successes, failures and the way forward in G. W. Witmer, W. C. Pitt, and K. A. Fagerstone, editors. Managing Vertebrate Invasive Species: Proceedings of an International Symposium. University of Nebraska, Lincoln.

* Cited for rodenticide table
* Reason for low efficacy of 1080
* Used to generate columns of “used in a successful mouse eradication” and “used in a failed mouse eradication” on the table

Marshall, E. F. 1984. Cholecalciferol: a unique toxicant for rodent control in D. O. Clark, editor. Proceedings of the Eleventh Vertebrate Pest Conference. University of California, Davis.

* Cited for rodenticide table
* The author examines the efficacy of cholecalciferol using choice and no-choice feeding studies. The LD50 for mice and rats is reported. The authors conclude that cholecalciferal is of low hazard to avian and canine species.

Morriss, G. A., C. E. O'connor, A. T. Airey, and P. Fisher. 2008. Factors influencing palatability and efficacy of toxic baits in ship rats, Norway rats and house mice. Science for Conservation **282**:26.

* Compares the palatability of rodenticides containing brodifacoum to products containing 1080. Brodifacoum was found much more effective due to the low palatability of 1080 (100% vs 8% death rate respectively)
* Study also found that other bait characteristics (bait medium, size, dye , or lure) effected palatability, only the toxin
* Two products containing Bromadiolone were tested as well and were shown to be palatable and lethal to mice

Nelson, P. C., and G. J. Hickling. 1994. Pindone for Rabbit control: Efficacy, Residues and Cost in W. S. Halverson, and A. C. Crabb, editors. Proceedings of the Sixteenth Vertebrate Pest Conference. University of California, Davis.

* Cited for rodenticide table
* This document discusses the efficacy of a pelletized pindone product on rabbit control. Only used to show Pinone can come in a pelletized product.

NRA. 2002. The NRA review of pindone. NRA Review Series. National Registration Authority for Agricultural and Veterinary Chemicals, Canberra, Australia.

* Cited for rodenticide table
* This is a report on the use and effects of pindone in Australia. Has a good amount of useful info, information on the hazard to mammals was taken from this document.

O'connor, C. E., and L. H. Booth. 2001. Palatability of rodent baits to wild house mice. Science for Conservation **184**:11.

* Cited for rodenticide table
* Authors tested the relative palatability and efficacy of four commercial rodenticides containing brodifacoum or coumatetralyl. Coumatetralyl was found to have low palatability in mice, and therefore low effectiveness.

Pelgar.co.uk. 2011. A Global Force in Pest Control. http://www.pelgar.co.uk/UKdifenacoum.htm

* Cited for rodenticide table
* Website for a pelletized rodenticide containing flucoumafen.

Pestcontrol.basf.co.uk. 2011. Enabling the most effective solutions to your pest problems. [http://www.pestcontrol.basf.co.uk/agroportal/pc\_uk/en/rural\_pest\_control\_uk\_initialsorextran sport/products\_rural\_uk\_initialsorextransport/rodent\_products\_uk\_rural\_initialsorextransport/ storm\_secure/Storm\_secure\_1.html](http://www.pestcontrol.basf.co.uk/agroportal/pc_uk/en/rural_pest_control_uk_initialsorextran%09sport/products_rural_uk_initialsorextransport/rodent_products_uk_rural_initialsorextransport/%09storm_secure/Storm_secure_1.html)

* Cited for rodenticide table
* Website for a pelletized rodenticide containing flocoumafen. It should be noted that this particular product is more block than pellet.

Pestcontrol-products.com. 2011. Pest Control Solutions the ultimate source for pest control products. http://www.pestcontrol-products.com/rodent/rodent\_baits\_lethal.htm#kaputblocks

* Cited for rodenticide table
* Website for a pelletized rodenticide containing warfarin. It should be noted that this particular product also contains a pesticide designed to kill fleas on rats and mice

Pitt, W. C., L. C. Driscoll, and R. T. Sugihara. 2010. Efficacy of rodenticide baits for the control of three invasive rodent species in Hawaii. Archives of Environmental Contamination and Toxicology **60**:533-542.

* Not directly cited for rodenticide table
* The authors compare nine commercially available rodenticides in choice and no choice uptake trials. The brodifacoum product was much more successful in causing mouse mortality. Given that this is a comparison of commercial products, I did not feel it was useful by itself in assigning rankings for effectiveness/uptake.

Purdue University. 2011. NIPRS national pesticide information retrieval system <http://ppis.ceris.purdue.edu/htbin/ppisprod.com>

* Cited for rodenticide table
* National Pesticide information retrieval system, Purdue University
* This is a website for the National Pesticide Information Retrieval System run by Purdue University. The website allows the user to search for pesticide products that have an active license with the USEPA. While this website allows for easy search of active products, determining more definite information on allowable uses would require a review of pesticide labels.

University of Herfordshire. 2011. PPDB: Pesticide Properties Database. <http://sitem.herts.ac.uk/aeru/footprint/en/index.htm>

* Cited for rodenticide table
* Pesticide type (second gen anti-coag) was taken from this document.

USEPA. 1996. Reregistration Eligibility Decision (RED) strychnine. United States Environmental Protection Agency, Office of Prevention, Pesticides, and Toxic Substances, Washington, D.C.

* Cited for rodenticide table
* This is an in depth document discussing strychnine. Cited limited approval for use in USA, specifically only approved for below-ground application to control of pocket gophers.

USEPA. 1998. Reregistration eligibility decision (RED) rodenticide cluster. United States Environmental Protection Agency, Office of Prevention, Pesticides, and Toxic Substances, Washington, D.C.

* Cited for rodenticide table
* This document has aLD50 data for the listed rodenticides and a bunch of info if more depth is needed
* This document is a reregistration eligibility decision (RED) for brodifacoum, bromadiolone, bromethalin, chlorophacinone and diphacinone. The document provides a detailed analysis of the various toxicological and ecological risks and effect of these rodenticides. Information includes risk to bird species.

USEPA. 1998. Reregistration eligibility decision (RED) zinc phosphide. United States Environmental Protection Agency, Office of Prevention, Pesticides, and Toxic Substances, Washington, D.C.

* Not directly cited for rodenticide table
* This is an in depth document discussing zinc phosphide. However, this document only discusses the effects and hazards of zinc phosphide when used in currently approved ways (i.e.- doesn’t extrapolate risks to island wide distribution).

USEPA. 2007. Pesticide fact sheet: difenacoum. United States Environmental Protection Agency, Office of Prevention, Pesticide and Toxic Substance.

* Cited for rodenticide table
* This document is a fact sheet for the 2nd generation anticoagulant difenacoum. This document contains registration information, LD50 information, and non-target hazard assessments.

USEPA. 2008. Risk mitigation decision for ten rodenticides. United States Environmental Protection Agency, Office of Prevention, Pesticides, and Toxic Substances, Washington, D.C.

* Not directly cited for rodenticide table
* Document’s focus is mostly on mitigation measures to reduce the hazards of licensed rodenticides when controlling commensal rodents.

USEPA. 2011. Pesticide product labeling system (PPLS) http://oaspub.epa.gov/apex/pesticides/f?p=101:1:505675057723971

* Not directly cited for rodenticide table
* United States Environmental Protection Agency Pesticide Product Label System
* This is a USEPA website that allows the user to search out active and inactive pesticide product labels. This website was not cited in the spreadsheet, but could be a useful source if allowable uses need to be confirmed via labels. (although the website wasn’t running very smoothly when visited on 9/21/2011)

Valchev, I., R. Binev, V. Yordanova, and Y. Nikolov. 2008. Anticoagulant rodenticide intoxication in animals - a review. Turkish Journal of Vetrinary and Animal Sciences **32**:237-243.

* Not directly cited for rodenticide table
* Has some information that could be useful in determining hazard. The document is mostly about the way these toxins work and move through the body.

Vandenbroucke, V., A. Bousquet-Melou, P. De Backer, and S. Croubels. 2008. Pharmacokinetics of eight anticoagulant rodenticides in mice after single oral administration. Journal of Veterinary Pharmacology and Therapeutics **31**:437-445.

* Cited for rodenticide table
* This study examines the movement of eight rodenticides through the body. The LD50 values match those already chosen for the excel table, which were largely derived from Fisher 2005. The authors may have taken the LD50 values from Fisher 2005, but no citation is provided. In addition, this paper provided an LD50 for chlorophacinone. The other seven rodenticides covered are: brodifacoum, bromadiolone, coumatetralyl, difenacoum, difethialone, flocoumafen, warfarin.

DOC. 2011. Brodifacoum a review of current knowledge. Department of Conservation Pesticide Information Reviews. DOC Research and Development Group, Threats Management Section, Hamilton, New Zealand.