
Form and Function

Changing invaders: the evolution of alien rodents on islands

Alexandra A.E. van der Geer¹, Mark V. Lomolino²

¹Naturalis Biodiversity Center, Leiden, The Netherlands, alexandra.vandergeer@naturalis.nl

²College of Environmental Science and Forestry, State University of New York, Syracuse, NY, USA

Introduced species often adapt their behaviour, morphology, and ecological niche in response to variables that differ from those of their native range. We analysed body size and island data for 241 rodent populations belonging to 16 species on 212 islands worldwide to test whether body size of insular populations of introduced rodents is correlated with the geographical and ecological characteristics of the islands as well as time in isolation. Introduced rodents follow the predicted island rule trend, with body size shifts more pronounced for populations with greater residence times on the islands. Body size of insular populations is positively correlated with latitude, consistent with thermoregulatory predictions based on Bergmann's rule. Body size of insular populations is negatively correlated with number of co-occurring mammalian species, especially other aliens, confirming an ecological hypothesis of the island rule. Carnivory in rats and mice in the form of predation on nesting seabird colonies seems to promote 1.4- to 1.9-fold increases in body size: Henderson Island (Pitcairn Islands) and Gough Island (South Atlantic) are home to rats and mice (respectively) almost twice the size of their mainland conspecifics. The island rule is a pervasive pattern in rodents, exhibited across a broad span of geographical regions, time periods and for introduced as well as native populations. Time in isolation impacts body size evolution profoundly. All insular populations of Polynesian rats (*Rattus exulans*) and Asian house rats (*Rattus tanezumi*), both Holocene introductions, evolve larger body sizes, whereas almost all Anthropocene populations of the brown rat (*Rattus norvegicus*) evolved smaller body sizes. Individual populations, however, varied substantially in their rate of body size evolution, with some populations exhibiting significant body size change in less than 400 years, here proposed as likely coinciding with increased levels of carnivory.

4 5 9

Julius-Kühn-Archiv

Jens Jacob, Jana Eccard (Editors)

6th International Conference of Rodent
Biology and Management
and
16th Rodens et Spatium

Potsdam, Germany, 3-7 September 2018

Book of Abstracts



Julius Kühn-Institut
Bundesforschungsinstitut für Kulturpflanzen

4 5 9

Julius-Kühn-Archiv

Jens Jacob, Jana Eccard (Editors)

6th International Conference of Rodent
Biology and Management
and
16th Rodens et Spatium

Potsdam, Germany, 3-7 September 2018

Book of Abstracts



Editors:

Jens Jacob¹ and Jana Eccard²

¹Julius Kühn Institute, Federal Research Centre for Cultivated Plants,
Institute for Plant Protection in Horticulture and Forests, Vertebrate Research,
Toppeideweg 88, 48161 Münster, Germany

²University of Potsdam, Institute of Biochemistry and Biology,
Animal Ecology Group, Maulbeerallee 1,
14469 Potsdam, Germany

Local Organizing Committee:

Jana Eccard, University of Potsdam

Jens Jacob, Julius Kühn Institute, Federal Research Centre for Cultivated Plants, Münster

Daniela Reil, Julius Kühn Institute, Federal Research Centre for Cultivated Plants, Münster

Christiane Scheffler, University of Potsdam

Elke Seydewitz, University of Potsdam

Scientific organising committee:

Emil Tkadlec (Czech Republic); Frauke Ecke (Sweden); Grant Singleton (Philippines); Heikki Henttonen (Finland); Jana Eccard (Germany); Jens Jacob (Germany); Lyn Hinds (Australia); Prince Kaleme (Congo); Xavier Lambin (UK); Zhibin Zhang (China)

International Steering Committee Rodens et Spatium:

Abraham Haim (Israel); Alexey Surov (Russia); Ana Maria Benedek (Romania); Boris Krasnov (Israel);

Emil Tkadlec (Czech Republic); Éric Le Boulengé (Belgium); Farida Khammar (Algeria);

František Sedláček (Czech Republic); Gert Olsson (Sweden); Grant Singleton (Australia);

Heikki Henttonen (Finland); Jan Zima (Czech Republic); Jean-François Cosson (France); Linas Balčiauskas

(Lithuania); Maria da Luz Mathias (Portugal); Molly McDonough (USA); Mustafa Sözen (Turkey);

Nigel Yoccoz (Norway); Olga Osipova (Russia); Takuya Shimada (Japan); Victor Sánchez Cordero (Mexico);

Xavier Lambin (United Kingdom); Yasmina Dahmani (Algeria)

International Steering Committee**International Conference of Rodent Biology and Management:**

Andrea Byrom (New Zealand); Charley Krebs (Canada); Grant Singleton (Philippines); Jens Jacob (Germany);

Jiqi Lu (China); Lyn Hinds (Australia); Nico Avenant (South Africa); Peter Banks (Australia);

Peter Brown (Australia); Regino Cavia (Argentina); Rhodes Makundi (Tanzania); Roger Pech (New Zealand);

Steven Belmain (UK); Sudarmaji (Indonesia); Zhibin Zhang (China)

Bibliografische Information der Deutschen Nationalbibliothek

Die Deutsche Nationalbibliothek verzeichnet diese Publikation

In der Deutschen Nationalbibliografie: detaillierte bibliografische

Daten sind im Internet über <http://dnb.d-nb.de> abrufbar.

ISSN 1868-9892

ISBN 978-3-95547-059-3

DOI 10.5073/jka.2018.459.000



Alle Beiträge im Julius-Kühn-Archiv sind unter einer

Creative Commons - Namensnennung - Weitergabe unter gleichen Bedingungen -

4.0 Lizenz veröffentlicht.

Printed in Germany by Arno Brynda GmbH, Berlin.