

---

## **Population Dynamics – Session 1**

---

### **Transient and seasonal drivers of population demography and virus transmission in rodents**

**Lucinda Kirkpatrick, Joachim Marien, Herwig Leirs**

Universiteit Antwerpen, lucinda.kirkpatrick@uantwerpen.be

Continuous wavelet transforms provide a means to identify common periodicities in noisy, non-stationary time series. This is particularly useful when modelling complex, non-linear relationships over a range of time scales, such as those commonly seen in population demography, disease and climate time series. Wavelet analysis can also be used to identify both consistent and transient relationships in noisy time series. Here, we use continuous wavelet transforms and coherency analysis to investigate population demography and arenavirus infection in rodents in relation to both global and local weather patterns. We show that while seroprevalence is related to rodent density, changes in both the intensity and variability of rainfall in our study region have differing consequences for density and seroprevalence. Finally, we detect phase shifts driven by changing weather patterns at higher resolutions than conventional methods of analysis would normally allow. These patterns are analysed within a Bayesian framework to identify relationships between transient climate drivers and rodent abundance and arenavirus infection while accounting for temporal correlation. Wavelet analysis can be used to detect high resolution, non-linear relationships between demography, transmission and changing climatic conditions in a strongly fluctuating rodent population.

4 5 9

# Julius-Kühn-Archiv

Jens Jacob, Jana Eccard (Editors)

6<sup>th</sup> International Conference of Rodent  
Biology and Management  
and  
16<sup>th</sup> 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)

6<sup>th</sup> International Conference of Rodent  
Biology and Management  
and  
16<sup>th</sup> Rodens et Spatium

Potsdam, Germany, 3-7 September 2018

Book of Abstracts



**Editors:**

Jens Jacob<sup>1</sup> and Jana Eccard<sup>2</sup>

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

<sup>2</sup>University 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.