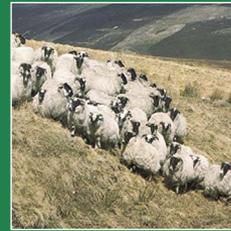


ISSN 2040-4700

NOVEMBER 2016

VOLUME 7 PART 3



# Advances in Animal Biosciences

## Proceedings of LiveM 2016: Modelling Grassland-Livestock Systems Under Climate Change



**CAMBRIDGE**  
UNIVERSITY PRESS

# Advances in Animal Biosciences

## Management Board

Nigel Scollan (Chair), Richard Dewhurst (BSAS), Mike Steele (BSAS), Howard Simmins (BSAS), Andrea Rosati (EAAP), Mattias Gauly (EAAP), Philippe Chemineau (EAAP), Nicolas Friggens (INRA), Stephane Ingrand (INRA), Jaap Van Milgen (INRA)

## Editor-in-Chief

Cledwyn Thomas, European Federation of Animal Science (EAAP)

## Aims and Scope

*Advances in Animal Biosciences* is an associated publication to the journal *animal*. It aims to publish high-quality conference, symposium and workshop proceedings about animal-related aspects of the life sciences with emphasis on farmed and other managed animals. These can be in the form of a book of abstracts, summaries or complete papers. The format will highlight the title of the meeting and organisations involved but the publications will have the added advantage of forming a series under *Advances in Animal Biosciences*.

Subject areas can include aspects of Breeding and Genetics, Nutrition, Physiology and Functional Biology of Systems, Behaviour, Health and Welfare, Livestock Farming Systems, Human Health and Product Quality.

However, due to the integrative nature of biological systems, monographs and conference proceedings dealing with the translation of basic and strategic science into the whole animal and farming system and the impact on Productivity, Product Quality, Food Security, the Environment, Climate Change and Humans will be particularly welcome.

## Information for Conference Organisers

The Animal Consortium together with Cambridge University Press offers conference organisers a package that enables publication of high-quality conference, symposium and workshop proceedings about animal-related aspects of the life sciences with emphasis on farmed and other managed animals.

Summaries, abstracts or full papers may be published in *Advances in Animal Biosciences* and high-quality invited papers from these meetings may be submitted and published as a defined series in *animal*.

Conference organizers interested in publishing their proceedings should send a proposal for publication in *Advances in Animal Biosciences*, *animal*, or both journals to [astleger-honeybone@cambridge.org](mailto:astleger-honeybone@cambridge.org) with the following information:

- Title and date of conference
- Contact person/guest editor
- Number of summaries/abstracts/full papers
- Total number of pages (estimated)
- Any colour printing requirements
- Number of hard copies or USBs required and form of distribution
- Target date for publication

A decision in principle will be made regarding the suitability for publication on the basis of your proposal, and the Special Issues Editor will provide a quote and agree any specific requirements or deadlines. Manuscripts submitted to *Advances in Animal Biosciences* will be reviewed by the Editor-in-Chief and papers submitted to *animal* will be peer reviewed. If accepted after review, proceedings will be published within 12 weeks of receipt by the Publisher.

# Proceedings of LiveM 2016: Modelling Grassland-Livestock Systems Under Climate Change

## Advances in Animal Biosciences

This issue is part of a series which is a companion to the journal ANIMAL

LIVEM2016

International livestock modelling conference  
Modelling grassland-livestock systems under climate change  
15-16<sup>th</sup> June 2016 Potsdam, Germany





## CONTENTS

	PAGE
<i>Kipling, R. P., Bannink, A., Özkan Gülzari, Ş. and Van Middelkoop, J.</i> Editorial	223
<i>van der Linden, A., van de Ven, G. W. J., Oosting, S. J., van Ittersum, M. K. and de Boer, I. J. M.</i> Exploring grass-based beef production under climate change by integration of grass and cattle growth models	224
<i>Virkajärvi, P., Korhonen, P., Bellocchi, G., Curnel, Y., Wu, L., Jégo, G., Persson, T., Höglind, M., Van Oijen, M., Gustavsson, A.-M. and Kipling, R. P.</i> Modelling responses of forages to climate change with a focus on nutritive value	227
<i>Bannink, A. and Dijkstra, J.</i> Effects of roughage characteristics on enteric methane emission in dairy cows	229
<i>Calanca, P.</i> Modelling the impacts of seasonal drought on herbage growth under climate change	231
<i>Mendes, L. B., Herrero, M., Havlík, P., Mosnier, A., Balieiro, S. F., Moreira, R. E. M. and Obersteiner, M.</i> Simulation of enteric methane emissions from individual beef cattle in tropical pastures of improving quality: a case study with the model RUMINANT	233
<i>Schönhart, M.</i> Heat stress impacts on cows in a case study landscape measured by an integrated modelling framework	235
<i>Galán, E., Sanchis, E., Estellés, F., Calvet, S. and del Prado, A.</i> Heat stress effects in milk yield and milk traits at farm scale	238

<i>Kipling, R. P. and Özkan Gülzari, Ş.</i> Stakeholder engagement and the perceptions of researchers: how agricultural modellers view challenges to communication	240
<i>Heinschink, K., Sinabell, F. and Tribl, C.</i> An index-based production costs system to evaluate costs of adaptation and mitigation in dairy and cattle farming	242
<i>Sándor, R., Ehrhardt, F., Basso, B., Bellocchi, G., Bhatia, A., Brilli, L., De Antoni Migliorati, M., Doltra, J., Dorich, C., Doro, L., Fitton, N., Giacomini, S. J., Grace, P., Grant, B., Harrison, M. T., Jones, S., Kirschbaum, M. U. F., Klumpp, K., Laville, P., Léonard, J., Liebig, M., Lieffering, M., Martin, R., McAuliffe, R., Meier, E., Merbold, L., Moore, A., Myrriotis, V., Newton, P., Pattey, E., Recous, S., Rolinski, S., Sharp, J., Massad, R. S., Smith, P., Smith, W., Snow, V., Wu, L., Zhang, Q. and Soussana, J. F.</i> C and N models Intercomparison – benchmark and ensemble model estimates for grassland production	245
<i>Leclère, D. and Havlík, P.</i> Modelling heat stress on livestock: how can we reach long-term and global coverage?	248
<i>Vitali, A., Bernabucci, U., Nardone, A. and Lacetera, N.</i> Effect of season, month and temperature humidity index on the occurrence of clinical mastitis in dairy heifers	250
<i>Bartley, D. J., Skuce, P. J., Zadoks, R. N. and MacLeod, M.</i> Endemic sheep and cattle diseases and greenhouse gas emissions	253
<i>Foskolos, A. and Moorby, J. M.</i> Lifetime nitrogen use efficiency of dairy cattle: model description and sensitivity analysis	256
<i>Mas, K., Pardo, G., Galán, E. and del Prado, A.</i> Assessing dairy farm sustainability using whole-farm modelling and life cycle analysis	259
<i>Hempel, S., Janke, D., König, M., Menz, C., Englisch, A., Pinto, S., Sibony, V., Halachmi, I., Rong, L., Zong, C., Zhang, G., Sanchis, E., Estelle, F., Calvet, S., Galan, E., del Prado, A., Ammon, C., Amon, B. and Amon, T.</i> Integrated modelling to assess optimisation potentials for cattle housing climate	261