



FACCE-MACSUR

DL1.2.2. Report on the analysis of interannual and seasonal variations in productive, reproductive and health data

Nicola Lacetera,*, Andrea Vitali, Umberto Bernabucci, Alessandro Nardone

¹ University of Tuscia, Via San Camillo de Lellis, 01100, Viterbo, Italy

*nicgio@unitus.it

Instrument:	Joint Programming Initiative
Topic:	Agriculture, Food Security, and Climate Change
Project:	Modelling European Agriculture with Climate Change for Food Security (FACCE-MACSUR)
Start date of project:	1 June 2012
Duration:	36 months
Theme, Work Package:	LiveM WP1
Deliverable reference num.:	D-L1.2.2
Deliverable lead partner:	University of Tuscia
Due date of deliverable:	Month 24
Submission date:	2015-01-18

Abstract/Executive summary

The work carried out under LiveM, L1.2 and described herein was based on construction and query of large databases which included multiannual productive and health field data. Productive data referred to dairy cows, whereas health data were relative both to dairy cows and pigs. The analysis pointed out significant seasonal variations of parameters under study. In synthesis, summer/hot season was associated with significant worsening of dairy cows milk composition and with significant higher risk of death in pigs. These results may help to predict consequences of climate change in economically important sectors of the livestock industry and also to identify and target adaptation options that are appropriate for specific contexts, and that can contribute to environmental sustainability as well as to economic development.

Table of Contents

1. Introduction	2
2. Methods	2
3. Results	2
4. Discussion.....	2
5. References	3

1. Introduction

Heat stress conditions imposed under a controlled environment have been shown to affect several aspects of animal physiology, productivity and health.

The activities carried out under LIVEM, L1.2 were aimed at assessing whether season was associated with changes of productive and health parameters in dairy cows or pigs.

2. Methods

The dairy cows database was based on milk composition/quality data. It included 656,064 milk somatic cell counts (MSCC), total bacterial count (TBC), fat (FA) and protein (PR) % data recorded in 3,727 dairy farms during seven consecutive years (Bertocchi et al., 2014). The MSCC data were interpreted as indicators of mammary gland health. The database relative to pigs contained mortality data of heavy slaughter pigs (approximately 160 kg live body weight) during transport and at lairage (Vitali et al., 2014). Data were obtained from 24,098 journeys and 3,676,153 pigs transported from 1,618 farms to 3 slaughter houses. These data were referred to a five years period.

3. Results

The analysis of milk data highlighted a significant association between year, season and month, and the parameters under study. Summer season emerged as the most critical season for milk quality with significant increases of MSCC and TBC and declines of both fat and protein% (Bertocchi et al., 2014). Within summer months, July presented the most critical conditions for TBC, FA and PR%, whereas August presented the highest MSCC values.

Pigs mortality data showed a greater risk of pigs dying during the hot season when considering both transport and lairage (Vitali et al., 2014). The month with the greatest frequency of deaths was July; the lower mortality risk ratios were recorded in January and March.

4. Discussion

Worsening of milk quality during summer months may be responsible for significant economic losses due to decrease in the milk price paid at cowshed. Furthermore, the increase of MSCC can be interpreted as indicator of higher incidence of mastitis which may have implications for animal welfare, milk safety and costs associated with treatments of infected animals.

Pig data, suggest that during summer months it would be important to implement market procedures aimed at improving animal welfare (i.e., pigs loading during night time, travel in the early hours of the day, and cooling devices on trucks).

These results may help to predict consequences of climate change in economically important sectors of the livestock industry and also to identify and target adaptation options that are appropriate for specific contexts, and that can contribute to environmental sustainability as well as to economic development.

Acknowledgements

We thank F. Guizzardi, S. Bignami, C. Morini, and S. Ambrosini (ASL Mantova, distretto di Viadana) for provision of pigs mortality data.

This paper is a contribution to the FACCE MACSUR knowledge hub.

The work was funded by MiPAAF-FILIGRANA Project (D.M. 25741/7303/11-01/12/2011), Italian Ministry of Health (IZSLER 03/07, PRC 2007003) and European community (GI-Neu EU project n° 324476) Università degli Studi della Tuscia.

5. References

- Bertocchi, L., Vitali, A., Lacetera, N., Nardone, A., Varisco, G., Bernabucci, U., 2014. Seasonal variations in the composition of Holstein cow's milk and temperature-humidity index relationship. *Animal*. 8, 667-674. DOI: 10.1017/S1751731114000032
- Vitali, A., Lana, E., Amadori, M., Bernabucci, U., Nardone, A., Lacetera, N. 2014. Analysis of factors associated with mortality of heavy slaughter pigs during transport and lairage. *J. Anim. Sci.* 92, 5134-5141. DOI: 10.2527/jas2014-7670