

# Livestock Environment VIII

## Abstracts

ASABE Eighth International Symposium

Iguassu Falls, Brazil  
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2008



## Preface

On behalf of the entire Planning Committee, we welcome you to the Eighth International Livestock Environment Symposium (ILES VIII), held in Iguassu Falls, Brazil (*Foz de Iguazu*). This unique conference has its roots in 1974 and was initiated by the Structures and Environment Division of the American Society of Agricultural Engineers (now ASABE). Past Symposia have been held in Lincoln, Nebraska, USA; Ames, Iowa, USA; Toronto Canada; Coventry, England; Bloomington, Minnesota, USA; Louisville, Kentucky, USA; and Beijing China. The strong tradition of an *international* emphasis on livestock environment continues with this 8<sup>th</sup> ILES, both in content of these proceedings and in the manner in which the Symposium was planned and executed.

This is the first time that the ILES has been held in the southern hemisphere. It is quite appropriate that Brazil serve as the host nation. Brazil is a leading agricultural producer, ranking at the top in global poultry and livestock production. We thank the Brazilian Society of Agricultural Engineers (SBEA) for their willingness to serve as our local hosts.

In this Symposium, there were two concurrent tracks across the three-day event. One of these tracks was a fairly substantial focus on myriad aspects of agricultural air quality issues regarding quantification and mitigation of facilities emissions. The second track provided a venue for the traditionally broad subject matter of ILES, including animal responses to environment, management and tools, modeling, animal welfare, systems and techniques and thermal environment.

A unique aspect of this ILES VIII was that it was concurrently held with the SBEA annual conference and with a special conference for the World Society of Agricultural Engineering, CIGR. In total, seven specialty conferences and symposia were held at the same time and place, making this a truly international event of substantial scope.

We would like to recognize the hard work and dedicated efforts of the ILES Planning Committee: ASABE staff Ms. Jane Bruck and Ms. Sharon McKnight for all their help; Mariane Spina from Aqua Consultoria of Brazil for her great help on the program, facilities and proceedings; Professors Hongwei Xin (Iowa State University) and Tadayuki Yanagi, Jr. (Universidade Federal de Lavras) co-chairs of the Programming Committee; Professors Richard Stowell (University of Nebraska) and Eileen Wheeler (The Pennsylvania State University) co-chairs of the Proceedings Committee; Professor Ilda de Fatima Tinôco (Universidade Federal de Viçosa) as Virtual and Technical Tour Chair; Professor Jarbas Honorio de Miranda (Universidade de São Paulo – ESALQ) as the SBEA Liaison; and Professor Irenilza Nääs (retired, State University of Campinas), President of CIGR, for her many efforts to make this entire event an outstanding success.

Let us celebrate the great success of the past ILE Symposia and be thankful for a stimulating and enjoyable ILES VIII. Here's to the continued success of the ILES and its embracement of a quest to develop and deliver timely information "*for all*" in the affiliated industries and professions.

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## Climate Change Influence on Inside Thermal Environment of Broiler Houses

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Climate change may substantially affect animal production. General circulation models (GCM's) have shown the trend of increasing air temperature in several parts of South America. Therefore, the goal of this work was to evaluate the influence of climate change on the inside thermal environment of broiler housings through simulation. In this study, mean air temperatures ( $t_{\text{mean}}$ ) and air relative humidity (RH) acquired in Lavras – MG - Brazil, from 1975 to 2005, totaling 30 years were used. The air velocity used to simulation inside the broiler houses was 2.0 m/s. These data were used as input in a mathematical model to predict the black-globe humidity index (BGHI) inside of poultry housings. Simulated results suggest the need of changing ventilation and cooling strategies and increase of structure thermal resistance to minimize the weather effects on the thermal environment inside of broiler housing.

## Strategies to Minimize Effects of Hot Climate Conditions on Livestock in Portugal: A Regional Approach

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In Portugal, animal production is of major significance, both economically and socially. Livestock are especially important to those regions in which agriculture is the main economic activity. Situated in Southwestern Europe, Portugal has a Mediterranean climate with hot and dry summer. Livestock farmers have to deal with high temperatures and with their effects on animal production. In most cases, breeders are not prepared to handle animals under high temperatures; they lack facilities and/or knowledge about this problem. We have begun work with the aim of developing strategies to monitor and prevent harm to animals (housed or raised outdoors) during the summer months. We need to identify the Portuguese regions most seriously affected by this problem, as well as where and for how long high temperatures occur most frequently. Both individual days with very high temperatures and heat waves are becoming more and more common in Portugal. The past four summers have been among the hottest ever registered. Since 2003, eight heat waves have occurred. We chose two locations in Portugal's Northeast to carry out a preliminary study in order to evaluate the occurrence of hot climate conditions in recent years; to develop methods of obtaining that data; and to learn how climatic factors (mainly temperature) evolve over the course of the summer. We can conclude that in this region livestock are commonly exposed to high temperatures for long periods. It is necessary to develop strategies to protect animals from the effects of such conditions.