International Conference of Agricultural Engineering

XXXVII Brazilian Congress of Agricultural Engineering

International Livestock Environment Symposium - ILES VIII

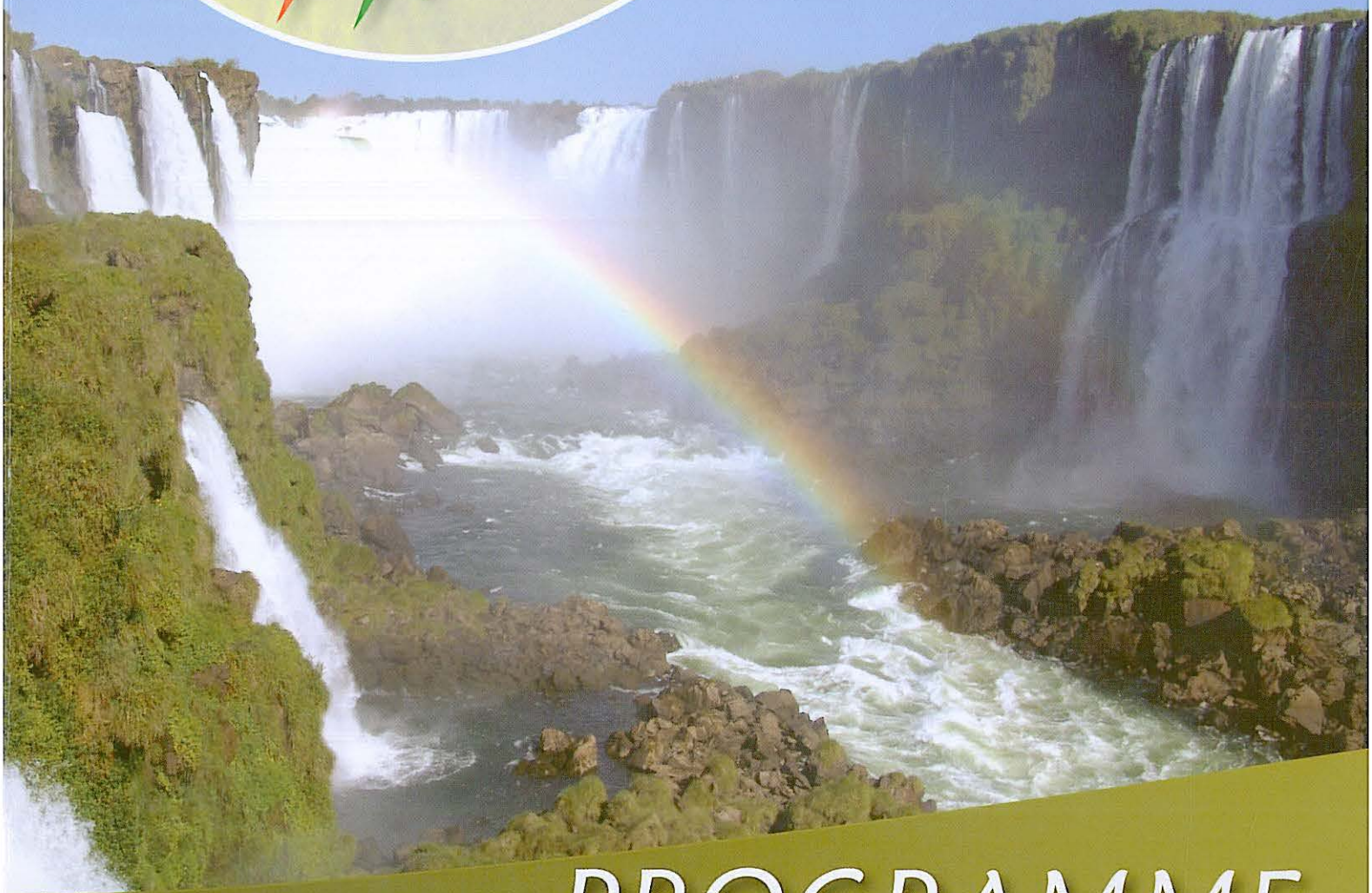
August 31st to September 4th, 2008
Iguassu Falls City - Brazil

INTERNATIONAL CONFERENCE OF AGRICULTURAL ENGINEERING

CIGR 2008 / BRAZIL

CENTRAL THEME

Technology for All: Sharing the Knowledge for Development



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Oral Session

Monday - September 01st, 2008

A5 - Interdisciplinary Issues - OS 01

10:30 - 12:30 PM Room: Araucária

- ESTIMATING SAMPLING DENSITY FOR ELABORATION OF YIELD MAPS
  Graciele Roberta Spezia; Eduardo Godoy de Souza; Lúcia Helena Pereira Nóbrega; Miguel Angel Uribe-opazo; Marcos Milan; Cláudio Bazzi.
- MAP OF MAGNESIUM EXPORT AND THE MAGNESIUM APPLICATION IN THE CULTURE OF THE SOYBEAN
  Eliceli Hasse; Eduardo Godoy de Souza; Claudio Leones Bazzi; Lúcia Helena Pereira Nóbrega; Grazieli Suszek.
- XML BASED ARCHITECTURE FOR REMOTE DATA COLECTING AND SHARING ON THE SUGAR CANE HARVERST AND TRANSPORTATION LOGISTICS
  Elcio Abrahão.
- PIXE ANALYSIS FOR NUTRIENT LOSSES EVALUATION FROM AGRICULTURAL SOIL DUE TO HEAVY MACHINERY PROCESSES
  Paulo E. Cruvinel.
- A DECISION SUPPORT SYSTEM FOR MANAGEMENT OF WATER RESOURCES
  José Carlos Mota; Vladimir Costa de Alencar; Wilson Fadlo Curi; Daniela da Silva Santos; Nilton César da Silva; Emmanuel Eduardo Vitorino de Farias.
- DEVELOPMENT OF A COMPUTER APPLICATION FOR ANALYTIC DETERMINATION OF "SUNRISE" AND "SUNSET" INSTANTS AND ASTRONOMICAL DURATION OF THE DAY FOR INCLINED SURFACES WITH ANY ORIENTATIONS
  Érico Tadao Teramoto; Luiz Gonsaga de Carvalho.

A5 - Interdisciplinary Issues - OS 02

3 - 4:30 PM Room: Araucária

- BROILER BEHAVIOR DURING FEEDING USING TWO DISTINCT FEEDERS
  Diego Pereira Neves; Irenilza de Alencar Nääs; Douglas D 'alessandro Salgado; Adriana Gomes de Menezes; Raquel Baracat Tosi Rodrigues da Silva; Alexandra Ferreira da Silva Cordeiro.
- CHARACTERIZATION OF HEAT WAVES WITH IMPACT OVER BROILER MORTALITY
  Marcos Martinez do Vale; Daniella Jorge de Moura; Irenilza de Alencar Nääs.

- STUDY ON THERMAL COMFORT, AIR QUALITY AND ENERGY SAVINGS USING BIOENERGY VIA GASIFICATION/COMBUSTION FOR SPACE HEATING OF A BROILER HOUSE
  Jadir Nogueira da Silva; Fábio Luiz Zanatta; Volkhard Scholz; Ilda de Fátima Ferreira Tinôco; Samuel Martin.

- DETECTING CALVING TIME OF DAIRY COWS BY ANALYZING ACTIVITY AND FEEDING BEHAVIOUR IN COMPUTER CONTROLLED SELF-FEEDERS MANAGEMENT
  Ephraim Maltz; Aharon Antler.

A5 - Interdisciplinary Issues - OS 03

5 - 7 PM Room: Araucária

- EFFECT OF RUBBER VS. CONCRETE FLOORING ON ANIMAL BEHAVIOUR AND HEALTH IN A DAIRY COW HOUSE
  Paolo Zappavigna; Paolo Liberati; Alessandro Gastaldo; Paolo Rossi; Ulrich Brehme; Paolo Venturi.

- AMBIENT POLLUTION FOR CATTLE BREEDING BUSINESS VERSUS THE FEDERAL AND STATE LAWS
  Eduardo Teixeira da Silva; Claudio de Souza Magalhães.

- MATHEMATICAL MODELING AND SPARK MAPPING OF SHADE STRUCTURES FOR CORRAL SYSTEMS IN HOT CLIMATES
  Mohamed Samer; Hartmut Grimm; Mohamed Hatem; Reiner Doluschitz; Thomas Jungbluth.

- GLOSSARY AND BASIC DEFINITIONS FOR ANIMAL HOUSING IN HOT CLIMATES
  Panagiotis Pangakis; Victoria Blanes-vidal; Jose Carlos Barbosa; Thomas Banhazi; Vasco Fitas da Cruz; Ephraim Maltz; Daniel Berckmans.

Tuesday - September 02nd, 2008

A5 - Interdisciplinary Issues - OS 04

10:30 - 12:30 PM Room: Araucária

- TRACEABILITY IN THE BRAZILIAN WINE SUPPLY CHAIN - MODELING AN INFORMATION SYSTEM BASED ON A SERVICE-ORIENTED ARCHITECTURE
  Osvaldo Gogliano Sobrinho; Carlos Eduardo Cugnasca; Antonio Mauro Saraiva.

- APPLICATION OF CLIMATE INFORMATION TO AGRICULTURE AND NATURAL RESOURCES RISK MANAGEMENT: THE SOUTHEAST CLIMATE CONSORTIUM EXTENSION PROGRAM
  Clyde William Fraisse; Joel Paz; David Zierden; Norman Breuer.

- COMMUNIY-BASED PRECISION AGRICULTURE REQUESTS TECHNOLOGY PACKAGES
  Sakae Shibusawa; Yuko Kato; Yuya Shibusawa.

- PROPOSAL OF AMBIENT AUDITOR SHIP IN COUNTRY PROPERTIES
  Eduardo Teixeira da Silva; Ana Cecilia Bastos Aresta Nowacki.

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ISSN 1982-3797

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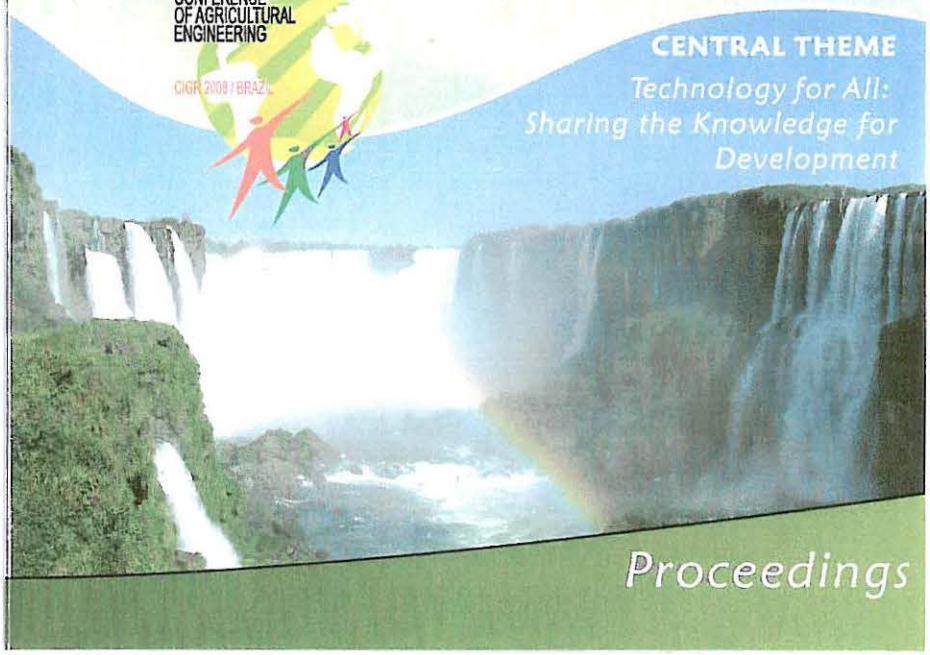

Proceedings

CIGR - International Conference of Agricultural Engineering
XXXVII Congresso Brasileiro de Engenharia Agrícola

Brazil, August 31 to September 4, 2008

GLOSSARY AND BASIC DEFINITIONS FOR ANIMAL HOUSING IN HOT CLIMATES

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Presented at
CIGR INTERNATIONAL CONFERENCE OF AGRICULTURAL ENGINEERING
XXXVII CONGRESSO BRASILEIRO DE ENGENHARIA AGRÍCOLA – CONBEA 2008
Brazil, August 31 to September 4, 2008

ABSTRACT: A first *'Glossary and Basic Definitions'* report has been prepared within the framework of Working Group *'Animal Housing in Hot Climate'* established under CIGR Technical Section II. It aims at setting-up uniformity in terms associated with Animal Housing, serve as a focal point for the development of useful new terms and definitions and become a useful tool for all those involved in the subject. It includes terms from Engineering, Thermal Biology and Environmental Physiology and can eventually become a background document for opening-up further discussions on the meaning of various terms used in *'Animal Housing'*.
KEYWORDS: Animal Housing, Hot Climate

INTRODUCTION: Frequently, in international meetings, report writing and expert communication confusion arises as to correct meaning and choice of terms due to improper translation from the original language into English which is the most used idiom internationally. This misunderstanding pertaining to *'Animal Housing'* was pointed out in the framework of Working Group *'Animal Housing in Hot Climate'* established under CIGR Technical Section II. Therefore, a seven member sub-group was appointed in September 2006 to coordinate an overall effort aiming at specific goals such as: (1) Establish uniformity in terms associated with Animal Housing, (2) Serve as a focal point for the development of useful new terms and definitions and (3) Become a useful tool for all those involved in the subject.

METHODOLOGY: An initial draft manuscript was prepared and circulated among sub-group members in February 2007 for commenting. Its first revision was presented in April 2007 at a Working Group meeting held in Cairo where extensive exchange of ideas took place, a lot of abeyances were clarified and a final decision to re-circulate the report among all Working Group members for further suggestions was taken. The report was finalized in September 2007. The idea behind its development was not to re-define terms, but rather find, adjust if needed and include as many as possible useful ones from various disciplines directly or indirectly related to *'Animal Housing'*.

During the development of the *'Glossary and Basic Definitions'* report the following questions arose:

1. Should it include all '*Animal Housing'* terms or only those pertaining to '*Hot Climate"*?
2. Should it be structured alphabetically or under specific categories (i.e. thermo-physical properties, animal behaviour and welfare, housing environment, structures-materials-equipment, etc.)?
3. How much in detail should it go?
4. Should it somehow reference the definitions and thus demonstrate that some of them are different or similar or relate to each other?
5. Should it distinguish the terms as '*Animal Science*' and/or '*Engineering*' oriented or use a broader definition that includes both?

The corresponding decisions were that the '*Glossary and Basic Definitions'* report should:

1. Include all possible '*Animal Housing'* terms
2. Be structured in an alphabetical order
3. Not go in too much detail, otherwise terms such as *'Animal Housing'* or *'Hot Climate'* should be included
4. Reference the definitions
5. Distinguish the terms as '*Animal Science'* or '*Engineering*' oriented

RESULTS AND DISCUSSION: The present version of the '*Glossary and Basic Definitions'* report includes 418 terms under all A to Z letters and the units used are based on the International System (SI). Examples of terms included from various disciplines are given below:

Engineering

Heat transfer coefficient: A parameter that determines the amount of heat that passes through a unit area of a medium or system in a unit time when the temperature difference between the boundaries of the system is one degree (W/m^2 ºC).

Jet-throw: The distance incoming air travels from an air inlet before it slows to a low velocity.

Permeance: Conductance of water vapour per unit area (ng water/s m^2 Pa).

Thermal Biology

Integrated relative thermal-comfort index: It integrates environmental and physiological condition in which the animal starts to thermoregulate under given housing conditions.

Thermal tachypnea: A rapid respiratory frequency accompanied by an increase in respiratory minute volume and, commonly, a decrease in tidal volume, in response to a thermoregulatory need to dissipate heat.

Thermoneutral zone: (1) The range of ambient temperature at which metabolic rate is at minimum and temperature regulation is achieved only by control of sensible heat loss. (2) The range of ambient temperature in which normal metabolism provides enough heat to maintain an essentially constant body temperature in homeothermic animals.

Environmental Physiology

Hyperthermia: The condition of a homeostatic animal that occurs when core temperature is above its range specified for the normal active state of the species.

Metabolic body size: The function of an animal's body size to which standard metabolic rate (or basal metabolic rate) is directly proportional. It takes into account the total body surface and weight. Usually referred to as body weight to the power of ¾.

Piloerection: (1) Involuntary bristling of hairs or ruffling of feathers. (2) An autonomic thermoeffector action, developed in response to cold environment conditions, often associated with behavioural (e.g. postural) adjustments.

The report makes use of 31 references ranging from Engineering Handbooks (HVAC, 1987) to other well established Glossaries [IUPS THERMAL COMMISSION, 2003; ASAE, 2001) and from widely used textbooks (ALBRIGHT, 1990) or reports (CIGR, 2002) to peered reviewed articles (PEDERSEN et al. 1998; BLANES and PEDERSEN, 2005). It obviously reflects the opinion of the Working Group members, but should not be considered as the ultimate one as inclusion of other possibly related terms (i.e. Archimedes number, sol-air temperature, etc.) is pending. However, it can hopefully become a background document for opening-up further discussions on the meaning and use of various terms pertaining to *'Animal Housing'*.

CONCLUSION: A first *'Glossary and Basic Definitions'* report has been prepared in the framework of Working Group *'Animal Housing in Hot Climate'* established under CIGR Technical Section II. It aims at establishing uniformity in terms associated with *'Animal Housing'*, serve as a focal point for the development of useful new terms and definitions and become a useful tool for all those involved in the subject. It includes 418 terms from Engineering, Thermal Biology and Environmental Physiology (e.g. heat transfer coefficients, thermal tachypnea, hyperthermia) and can eventually become a background document for opening-up further discussions on the meaning of various terms used in *'Animal Housing'*.

ACKNOWLEDGEMENT: The authors wish to thank all Working Group members who offered valuable comments through the development of this '*Glossary and Basic Definitions'* report.

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