



OptiBarn Project Annual Meeting

January 11-12, 2016, Navitas Building, room 03.070, Aarhus University

Participants

Thomas Amon, Sabrina Hempel, Marcel König, Annemarie Englisch, Severino Pinto (ATB)
Christoph Menz (PIK)
Agustin del Prado, Elena Galan (BC3)
Salva Calvet (UPV)
Vered Sibony (ARO)
Guoqiang Zhang, Li Rong, Chao Zong, Xiaoshuai Wang (AU)
Nick Hutchings (Guest – AU Agroecology), Thomas Bartzanas (Guest – CERTH, Greece/AU)

Meeting agenda

Monday (11th)

09:00-09:30 Welcome
09:30-10:30 WP1 “Simulation of livestock housing climate ...”
10:30-10:45 Coffee break
10:45-11:45 WP2 “Development and implementation of adaptive smart NVB ...”
11:45-12:15 Research in the broader fields of OptiBarn (1)
MACSUR: Presentation of Nick and discussion of cooperation
12:15-13:15 Lunch
13:15-17:00 Visit of research facilities at AU Foulum
17:00-18:00 WP3 “Investigation of animal-specific stress ...”
19:00 Dinner

Tuesday (12th)

09:00-10:00 WP4 “Impact assessment”
10:00-10:15 Coffee break
10:15-11:15 WP5 “Coordination and Dissemination” + cross-cutting issues/papers
11:15-11:45 Research in the broader fields of OptiBarn
On-going proposals/research: each partner has the opportunity to give an overview on activities that are not directly linked to OptiBarn but are topically related
11:45-13:00 Lunch
13:00-14:00 Research in the broader fields of OptiBarn (3)
New ERA-NET call: SusAn
14:00-14:15 Coffee break
14:15-15:00 Next steps/next meeting
15:00 Individual discussions

Following a warm welcome and a round of introduction, presentation of tasks, activities and publication plans in the individual work packages started.

The presentation of WP I on “Simulation of livestock housing climate for region-specific barn concepts and climate boundary conditions” addressed the status of the development of the barn scale model which is expected to be available in spring 2016. The analysis of weather and climate data and the preprocessing of the climate simulations are on-going. Measurements of barn climate focus on the German barns so far, but shall be extended to Israel and Spain. How to determine the wind profile and computational domain for the individual barn-scale models in WP I and II has been discussed, but no final decision has been made.

The presentation of WP II on “Development and implementation of adaptive smart NVB and environmental control” addressed the new concept of ventilation systems such as partial pit ventilation, hybrid ventilation, and precision zone ventilation. Experimental measurements were conducted in climate chambers at Air Physics Lab. The effect of environmental factors on heat stress in cattle barns is reviewed from literature to identify optimization potentials. Results from the SmartVent project focusing on the development of hybrid ventilation systems are reviewed and the feasibility of such systems in the framework of OptiBarn is assessed. CFD simulations to quantify the effect of earth-heat-exchanger are on-going.

A guest presentation from the MACSUR project highlighted the necessity to improve the linkage of individual component models (e.g., barn models, emission models or animal models) to be used in farm models. The challenges of MACSUR include the required database of animal housing models and measurements from animal housing and the comparison of animal housing models among each other and with measured data. The OptiBarn partners agreed to intensify the collaboration with MACSUR in terms of exchanging information and comparing farm model outputs.

After the group visited the research facilities at AU Foulum, the presentations of WP III on “Investigation of animal-specific stress in distinct climates” highlighted the limitations of the purely environment-based assessment of cattle heat stress. Multiple animal-based indicators were presented. Among those the respiratory frequency, the body core temperature and the behavior has been analyzed and discussed in detail. In 2015 the German study focused on the respiration which is a very fast indicator, but cannot yet be measured automatically. The Israeli study focused on the body core temperature and highlighted the relation of this indicator with ventilation and cooling management. In summer 2016 and winter 2017 common experiments with climate, respiration and body temperature measurements in Germany, Israel and Spain are planned.

On the second day the meeting continued with the presentation of WP IV focusing on an “Environmental and economical impact assessment”. The literature on gaseous emission from cattle buildings was reviewed to identify the main influencing factors. A systematical sensitivity analysis will be performed based on data from the pilot farms. Evaluation of expected economic impacts and risk management options, including a review of heat stress impacts, risk factor assessment and cost-benefit-analysis, is being prepared. Input variables has to be derived from results of the modeling activities in WP I – III.

A description document for the pilot farms that has been created at the beginning of the project will be updated to collect all input parameters that turned out to be crucial for the different modeling scales (animal model, barn model, farm model, climate model).

Following the topical presentations, aspects of coordination and internal and external dissemination have been discussed. The participants agreed to use CIGR and EAAP conferences in June and August as well as small conferences, workshops and summer school to make OptiBarn more visible in the scientific community. Co-organization of a special topical session on OptiBarn at EAAP 2016 is intended. This can be also used as an opportunity for the next meeting. According to this, the teleconference for the biannual status evaluation may be shifted to September. Finally, it has been discussed to combine the second annual meeting of OptiBarn with the common winter experiment in Valencia (probably mid-January). The final date and place will be announced later.

In order to better address stakeholders the participants agreed to provide a summary of the annual meeting that will be made public in different languages. The homepage will be updated accordingly.