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Newsletter BioBusiness

WHEN BIOLOGY MEETS TECHNOLOGY

<http://www.bio-business.eu/>

BioBusiness is a Marie Curie Training Program based upon the collaboration of animal scientists and engineers to create technological solutions through applied research and innovation for the livestock industry.

ROLE OF EACH FELLOW IN THE PRODUCT GROUPS

Tom Van Hertem

Modelling animal behaviour for lameness detection and experimentation



Gunel Ismayilova

Labelling



Qin Tong

Improvement of incubation conditions & monitoring embryonic development



Nancy Roulston

Chick welfare, project management & product development



Andrés Schlageter Tello

Selection of golden standard, scoring and labelling



Maciej Oczak

Product development



Hakim Bergoug

Assessing whether incubation profiles have lasting effect during rearing



Anna Johansson

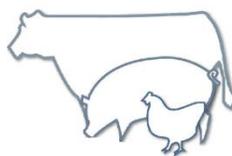
Determination of welfare indicators at early post-hatch (Collaboration with SLU)

Daniel Rozen
Project management & product development

Lilia Sonoda
Field experiments & on-farm observations

Model and control development

Stefano Viazzi



Carlos Eduardo Bites Romanini



CONSORTIUM



RESEARCH AND PRODUCT DEVELOPMENT PROGRESS

Improved conditions for incubating eggs



The aim of chicken group is to narrow the hatch window by synchronising the hatching process. The goal is improve welfare by shortening the time newly hatched chicks go without food and water. This may also improve flock uniformity by ensuring that all chicks have an equal start. Chicks are assessed until market weight on their health, welfare and performance. Several sets of experiments have been completed. At RVC, Qin tested natural sound and elevated CO₂ as means to improve incubation. Both treatments shortened and delayed the hatch window. At Anses, commercial scale experiments assessed the effect of a shortened hatch window and also the effect of transport duration. Preliminary results showed reduced performances from flocks with long transport durations. Fellows from RVC and Anses were involved in a secondment period at KU Leuven with the group's engineer Eduardo. They collaborated on monitoring and modelling the relationship between eggshell temperature and the chick's hatching process. This collaboration period resulted in an algorithm to track the bird's activity. This algorithm will be used to link the bird's activity level to welfare and performance parameters. Nancy (fellow from Petersime) and Anna (fellow from SLU) are involved in collecting welfare indicators of the day old chick and during the rearing stage. Nancy is working on decoding chick vocalisations and Anna is incorporating the Welfare Quality protocol into the project.

Automatic detection of lameness in cows



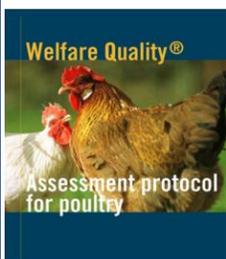
The objective of the cow group is to develop an automatic lameness detector for dairy cows based in the analysis of video images. Since last year, the machine vision concept moved from 2D side view to 3D top view. This change improved the cow segmentation, reduced the amount of space in the farm needed to perform the experiments and it also helped with the extraction of the parameters to assess lameness. At the moment, the back posture has proved to be the best indicator for lameness detection extracted from the 3D images. An operational setup was built in a commercial farm in Israel with the use of a 3D top view camera in order to develop and verify an automated lameness detection algorithm. A total of 1100 videos of cows were recorded and used to develop and validate the algorithm. Our algorithm achieved a sensitivity of 54%, and a specificity of 90%. The next step in the project is to increase the overall performance in order to meet the desired specifications that the group has determined (75% sensitivity and 90% specificity). This will be reached by analyzing the factors causing the misclassifications followed by improving the experimental set-up (frames per second and increasing the angle of the cameras) and finally repeating the experiments. We will analyze the possibility of making an individual threshold for every cow and try to integrate other sensors from the farm e.g. activity sensor. We believe that these factors may increase the accuracy of our proof of concept.

Automatic monitoring of pig aggression



The pig group has made significant progress in 2012. We developed and tested a new method to reduce the level of aggressive behaviour among mixed pigs that uses the intelligence of the animals and their natural curiosity. Based on our previous trials and literature, sound and feed were selected as efficient triggers to attract pigs with the objective of redirecting their attention from agonistic behaviours. To test this concept, experiments at TiHo's experimental farm trained piglets in the farrowing unit to associate a sound with food using an automatic dog feeder. After 8 days, the piglets were mixed in groups of 12 animals. When the researcher noticed an agnostic behaviour, the same combination of sound and feed was applied. The trials were video recorded and then analyzed by the fellows. After the sound was generated, the number of piglets around the feeder increased with consecutive training days. The results from the training indicated that the piglets were able to learn the commands on an average of 8 days of training before mixing. A well-timed sound-food trigger can be used for decrease the number of certain aggressive events. In general, there are few aggressive individuals in the pens who start the most of the agonistic interactions, however aggressors responded better to the feeder than the receivers.

BioBusiness and Welfare Quality projects working together. Welcome Anna and SLU!!!



The Welfare Quality®-project, developed between 2004-2009, provides a science-based methodology to assess animal welfare and provides relevant information for all stakeholders (public, consumers, farmers, retail and legislators). The project involved approximately 250 scientists from 17 countries. Three welfare assessment protocols were developed for poultry, cows and pigs. The poultry protocol is integrated into the BioBusiness project with the introduction of PhD student Anna Johansson as the 12th fellow. Anna is a PhD candidate at the Swedish University of Agricultural Sciences under Prof. Harry Blokhuis. Anna's research involves automating the Welfare Quality® protocol for broilers using the concept of PLF. Anna collaborates with the BioBusiness chicken group and contributes to welfare assessment during the rearing period and the potential connection to early post hatch and incubation indicators.

3RD BIOBUSINESS WORKSHOP. PAESTUM, ITALY

This event was organised by the project's fellows and supervisors from the Università degli Studi di Milano and the KU Leuven and made possible by the generous sponsorship of DeLaval.

The BioBusiness Project hosted its third official workshop in Paestum, Italy on September 11th, 2012. Each BioBusiness workshop has three goals: to gain valuable input from the livestock industry stakeholders, to highlight the progress of the project's fellows and to facilitate discussion and collaboration. More than forty participants attended the event.

The workshop began with the three presentations by the fellows: Nancy Roulston on Improving Incubation conditions for eggs and assessing the impact on chickens; Tom Van Herterem on Automatic lameness detection in dairy cows; and Gunel Ismayilova on PLF tool for pig aggression. In each of these presentations, it was clear and rewarding to see each group's research progress and to see the fellows gain confidence presenting their work. "The fellow's presentations were an absolute high, excellent work", said Heiner Lehr, director of Syntesa.

Afterwards, three distinguished speakers took the stage: Peter Sandoe, professor of Bioethics from the University of Copenhagen with his talk titled *Ethical perspectives on PLF technology*. Second, Peter Stevenson, chief policy advisor for Compassion in World Farming, gave a lively talk on *The impact of industrial livestock production on animal health and welfare*. Third, Leo den Hartog, R&D director for Nutreco, excited the crowd with *The potential risks of using PLF with the view from industry*. A dynamic and proactive atmosphere was set throughout the day by the workshop's facilitator Carsten Borch. Conversation continued into the evening as the participants mixed and mingled only be interrupted by a delicious Italian pasta and fish cuisine.

Feedback from the participants suggested that stakeholders from the general public and farmers should be included in the next workshop.



Interactive introduction of participants



Questions after Peter Stevenson's lecture



Participants listening to Leo den Hartog's presentation



Lunch time



Participants drawing conclusions from the workshop

On Thursday September 13th, the BioBusiness team visited two buffalo milking farms in Paestum. The first, Vanullo, is an organic buffalo milk farm in Italy. This farm demonstrated the robotic milking system in action! The second farm, Il Tempio, utilizes a gas digester that turns buffalo manure into energy. The private tours provided opportunities to see innovative technology applied on commercial farms and to gain feedback directly from the farmers. And of course, the buffalos were lovely to pat and photograph. To conclude the workshop, the fellows toured the Paestum's ancient Greek ruins for some fun in the rain and sun.



Visit to Vanullo buffalo farm



Visit to Il Tempio buffalo farm



Fellows at Paestum's Greek ruins