



Animal Genetics



Animal Nutrition



Animal Management and Health



Animal Physiology



Intensive Stock Farming Systems



Cattle Production



Sheep and Goat Production



Pig Production



Horse Production

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## 61st EAAP Annual Meeting of the European Association for Animal Production

Heraklion, Crete Island, Greece 23-27 August, 2010.  
[www.eaap2010.org](http://www.eaap2010.org)

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# SABRE

CUTTING EDGE GENOMICS FOR SUSTAINABLE ANIMAL BREEDING



## SABRE Conference @ EAAP



Food Quality and Safety

### 4<sup>th</sup> SABRE Conference integrated with 60<sup>th</sup> EAAP Annual Meeting

SABRE previously organised 3 conferences to disseminate the plans and results of the project: "Sustainable Animal Breeding" (September 2006), "Genomics for Animal Health" (June 2007 in collaboration with EADGENE - European Animal Disease Genomics Network of Excellence) and "Welfare and Quality Genomics" (September, 2008).

We would like to thank the organising committees of EAAP for the opportunity to integrate the 4<sup>th</sup> SABRE Conference into the 60<sup>th</sup> EAAP Annual Meeting. We are very pleased that over 30 papers which stated "**These results are obtained through the EC-funded FP6 project SABRE.**" have been accepted by the EAAP committees to be presented in the poster halls and lecture theatres. These papers will be presented throughout various sessions, in an effort to reach the audiences who are interested in the subjects dealt within the SABRE project.

The following pages will provide you with a first insight into the project. For further details we invite you to attend the SABRE presentations or to visit [www.sabre-eu.eu](http://www.sabre-eu.eu).

*Chris Warkup, SABRE Coordinator*

*Toine Roozen, SABRE Operations Manager*

### Cutting Edge Genomics for Sustainable Animal Breeding

Animal breeders have made considerable progress in recent decades in improving the economic efficiency of food production (this is one of the reasons the real price of food has fallen), but in recent years animal breeding has become more complex with breeders needing to broaden their breeding objectives. Nowadays breeders want to improve a wide range of traits, such as product quality, welfare related fitness traits and disease resistance. Many of these traits are difficult or expensive to measure and this is where the science of genomics is valuable. Through research such as the SABRE project, scientists are beginning to unravel which genes and which variants of these genes are important to explaining the genetic component of these new selection traits. 'Sustainable Animal BREeding' is the main focus of the SABRE Integrated Research Project.

The European Integrated Research Project "SABRE" (Cutting Edge Genomics for Sustainable Animal BREeding) is an innovative four-year, €23 million pan-European project which utilises the latest techniques in genetic science to develop more economically and environmentally sustainable production systems for cattle, pigs and chickens. The 'headline' objectives of the project are:

- To provide fundamental knowledge on the genomics and epigenetics relating to livestock
- To provide understanding of biological systems central to sustainability
- To identify genes and markers allowing focused breeding for sustainability goals
- To demonstrate the effectiveness of genomics for sustainable breeding
- To disseminate existing knowledge and new results to the user community
- To develop skills and training to best capitalise on new genomics knowledge.

Thirty three leading animal breeding research groups and businesses have joined forces in the project which commenced in April 2006 and has been made possible by a €13.9 million grant under Thematic Priority 5, "Food Quality and Safety", of the 6<sup>th</sup> Research Framework Programme of the European Union (FP6). The SABRE work programme, involving almost 200 scientists in 14 countries, is divided into 13 Work Packages. These harness key areas of emerging genomic and



**Conjugated linoleic acids effects on adipogenesis gene expression in ovine preadipocytes**

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Conjugated linoleic acids (CLA) have wide interest regarding their condition of dietary bioactives with potential ability to modify the adipogenesis, although their effects are contradictory and not well understood. In order to explore the effects of these compounds in ovine adipose tissue, we analysed the effect of isomers trans10, cis12 and cis9, trans11 on the differentiation of ovine preadipocytes. Preadipocytes obtained from lamb subcutaneous (SC) and omental (OM) tissues were cultured and induced to differentiate by 1.6 microg/ml insulin, 2nM tri-iodothyronine, 10 nM dexamethasone, 10 microM rosiglitazone and one of the two isomers (50 microM) or a mixture of the two (25 microM each). mRNA expression levels of the transcription factors PRARg, ADD1 and C/EBPa and the lipogenic enzymes lipoprotein lipase (LPL) and acetyl CoA carboxylase (ACC) were analyzed through the differentiation period (7 days) by quantitative real time RT-PCR. The delta delta Ct method was used to calculate the relative gene expression. Data were analysed by Anova. All markers increased their expression during the differentiation process but addition of CLA had little effect on expression levels of the genes analysed as only the levels of expression of ADD1 on the 7<sup>th</sup> day of differentiation of SC preadipocytes were different from the control treatment ( $P>0.05$ ). These, and previous results showing a tendency to increase the number of cells when CLA were added, suggest that CLA may act through a mechanism that could stimulate lipid filling without involvement of the adipogenesis cascade.

**The use of ultrasounds to predict lean meat proportion of lamb carcasses**

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The objective of this work was to study the use of ultrasounds to predict lean meat proportion of lamb carcasses. One hundred and twenty lambs (80 males and 40 females) of Churra Bragançana Portuguese local breed with a mean live weight of  $23.0 \pm 6.9$  kg were used. Lambs were scanned using an ALOKA SSD-500V ultrasound machine, equipped with one probe of 7.5 MHz, at lumbar and sternal regions. The images were analysed in order to measure the longissimus muscle depth (LD), subcutaneous fat thickness (SF), between the 12<sup>th</sup> and 13<sup>th</sup> vertebrae, and breast bone tissue thickness at 3<sup>rd</sup> (BT3) sternebrae. Lambs were slaughtered after 24 h fasting and carcasses were cooled at 4 °C for 24 hours. Carcass left side was dissected into muscle, subcutaneous fat, intermuscular fat and bone and remainder (major blood vessels, ligaments, tendons, and thick connective tissue sheets associated with some muscles). The LD, SF, BT3 and hot carcass weight were fitted as independent variables to predict lean meat proportion, of carcasses. Hot carcass weight explained 18.9% of lean meat proportion with a mean square error of 3.5%. Model including tissues measurements explained 57.2% of lean meat proportion with a root mean square error of 2.6%. These results indicate that carcass tissues measured by ultrasounds can be used to predict the lean meat proportion of Churra Bragançana lambs.

**Statistic-genetical analysis of auction price of Texel, Suffolk and German white-headed mutton rams**  
Maxa, J.<sup>1</sup>, Borchers, N.<sup>2</sup>, Thomsen, H.<sup>3</sup>, Simianer, H.<sup>1</sup>, Gauly, M.<sup>1</sup> and Sharifi, A.R.<sup>1</sup>, <sup>1</sup>University of Göttingen, Institute of Animal Breeding and Genetics, Albrecht-Thaer-Weg 3, 37075 Göttingen, Germany, <sup>2</sup>Chamber of Agriculture of Schleswig-Holstein, Section of Animal Husbandry and Breeding, Futterkamp, 24327 Blekendorf, Germany, <sup>3</sup>University of Aarhus, Research Centre Foulum, Department of Genetics and Biotechnology, P.O. Box 50, 8830 Tjele, Denmark; jmaxa@gwdg.de

The impact of performance traits recorded at licensing as well as various factors that affect auction price were determined for Texel, Suffolk and German white-headed mutton rams in Schleswig-Holstein. Furthermore, genetic parameters for the performance traits and for the auction price were estimated. Data used in this study were collected from 1988 to 2007 by the Sheep Breeding Organisation in Schleswig-Holstein, Germany. The auction prices in the range from 150 to 1,000 € of rams of mentioned breeds between 170 and 270 days of age were included in the analysis. General Linear Models and Multiple Regression Analysis were used to identify the impact of traits and effects on the auction price. Estimation of (co)variance components was carried out using multivariate animal model. From the traits recorded at licensing, live weight, followed by type traits of conformation and muscle mass, had the highest impact on the auction price. The results indicated that ultrasound measurements of muscle and fat depth had a minimum impact on the final auction price. The effect of breed, Prion Protein genotype and owner of the ram attached the importance of customers and affected significantly the auction price of the rams. The estimates of genetic parameters showed favourable genetic correlations between auction price and other performance traits.

**Influence of breed, farm, age at first lambing and number of lambing on length of productive life in sheep**

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The life performance of female sheep is one of the most important economic traits in sheep husbandry. The objective of this study was to perform a survival analysis to estimate the effects on length of productive life in sheep. Therefore, a dataset with 16,972 female sheep from a breeding association of northern Germany was analysed. The data included information about the breed, lambing dates, number of lambs each lambing, date of birth, date of death or culling, farm and breeder, total number of lambings in lifetime associated with the total number of born lambs alive or dead in lifetime. About 25% of the records were right-censored. A proportional hazard model assuming a Weibull distribution for the baseline hazards function was applied (Survival Kit V3.12). The final model included the effects of the breed (n=7) and the age at first lambing in classes (n=4) as fixed effects, the farm (n=319) as random effect and the lambing number (n=10) as a time-dependent effect. All effects showed a significant effect on length of productive life ( $P<0.001$ ). The German Blackheaded Mutton breed showed the lowest risk ratios being culled (RR=0.55) compared to the Texel breed (RR=1.00). The highest culling risk within the effect of the breed was found for the Suffolk breed (RR=1.19). By increasing number of lambings the hazard slightly decreased from first (RR=1.00) until seventh lambing (RR=0.09). Thereafter, the risk ratio increased until the tenth lambing and higher. The hazard rate of the effect age at first lambing showed an unexpected trend. If ewes were older than two years at first lambing the risk ratio decreased (RR=0.74) compared to the age at first lambing from 395 till 455 days (RR=1.00).