



PROJECT REVIEW

NAME: Agnese Balzani	
INSTITUTE: Newcastle University	FULL TIME Year 2
TITLE: Improving udder quality traits in sows to aid survival, health and lifetime performance of piglets	
<p>AIMS & OBJECTIVES:</p> <p>The overall aim of this project is therefore to develop methods to classify and improve udder traits (e.g. conformation, ease of colostrum extraction, colostrum quality) in sows, which will enhance piglet survival, immune status and long term performance.</p> <ul style="list-style-type: none"> To determine how udder conformation measures change over the reproductive cycle and lifetime of the sow. To estimate the heritability of key udder traits and their genetic correlations with other important maternal selection criteria. 	

KEY MILESTONES:	TARGET DATE:	ACHIEVED DATE:
1. Scientific review and current knowledge on udder traits and colostrum composition in sows.	March 2013	May 2013
2. Scoring system for udder conformation and colostrum extraction ease.	March 2013	March 2013
3. Scoring system for the best phenotypic measures of udder quality to use in replacement gilts.	June 2014	In progress
4. Report on the relationship between udder quality measures, colostrum composition and piglet performance.	June 2014	In progress
5. Longitudinal study on sow udder conformation changes	Sep 2014	In progress
6. Study heritability of udder traits and interaction with other important traits	May 2015	
7. A cost-benefit analysis of a strategy to improve udder quality in sows	May 2015	
8. Presentations to relevant scientific societies and communication to relevant stakeholders.	As results become available	
9. Submission of PhD Thesis	October 2015	

PROJECT REVIEW AND COMMENTARY:

A review of the topic revealed that no study has been done on the associations between udder conformation and piglet survival and milk production. Morphological and genetic studies on the sow udder are extremely recent and are orientated to teat functional number and mammary gland characteristics in terms of milk production. Udder conformation studies in other species were also reviewed, and gave rise to the first pilot experiment which investigated the repeatability of measurements of different udder characteristics, the similarity between the two rows of teats, the systematic changes in morphology before and after farrowing, and the relationship between different udder conformation traits. This preliminary study showed that measures of udder conformation are repeatable within sow. Since they do not differ significantly between sides, in either standing or lying posture, they can be collected only from one side to save time. The significant relationship between the traits taken in a standing up posture with the same traits recorded in a lying down posture, suggests that it is possible to take those measurements only from one posture. The measures show significant variability between sows and do not change markedly in the days shortly prior to farrowing. Measures, which use anatomical landmarks as the reference point, are more reliable than those using the floor of the pen. A practical method to classify udder conformation was developed using the results of the first experiment.

Currently we are undertaking an experiment, which will finish in April 2014, investigating the relationship between udder conformations, piglet performance, and colostrum quality and extraction ease in sows. Simple on-farm methods to determine colostrum quality (the BRIX refractometer), and piglet immunoglobulin uptake (the Immunocrit method) are



being evaluated. But studying the same animals at consecutive farrowings, we will also investigate how udder traits change during the life time of the sow.

The results available from this study are necessary to develop a scoring system for assessing udder quality that can be used in the selection of replacement gilts. Following the completion of above trials the heritability of key udder traits and their genetic correlations with other important maternal selection criteria will be estimated. To do this, measurements on animals will be carried out in collaboration with the industrial partner ACMC. This will give access to a large number of sows of known pedigree for which other relevant selection traits have been recorded.

POTENTIAL BENEFIT TO INDUSTRY:

Piglet mortality is a major source of financial loss to the British industry. Currently ~1.5 million liveborn piglets annually do not survive until weaning, and this number is likely to increase as genetic changes in prolificacy reach production herds. The importance of the acquisition of passive immunity in the first 24h of life for subsequent lifetime health and performance makes this a key contributory factor in raising the health status of the British herd, a key BPEX objective, and to overall farm profitability. A practical method to determine udder conformation and colostrum quality will allow a breeding company to take udder traits and colostrum composition into account, allowing the selection of sows with better nursing capacity and improving colostrum accessibility and quality. This should in turn increase number and quality of weaned piglets and hence annual meat output and animal welfare.

SUPERVISOR: Professor Sandra Edwards and Professor Heather Cordell

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Notes from Seminar: