

Animal Genetics

–Winter 2011

INTRODUCTION

The Animal Genetics Research Unit undertakes research and development to achieve continuous improvement in genetics and breeding technologies in beef and sheep enterprises across the State. We take a whole production system approach (from “conception to consumption”) to assist livestock industries achieve economic and environmental sustainability. This function is essential to maintain long-term competitiveness and sustained economic growth in the meat and wool industries of NSW.

Genetic improvement is a gradual process hence we have adopted a continuous improvement and innovation approach to animal breeding. Our research covers traditional as well as new DNA-based breeding technologies and strategies. We currently have several research projects with breeding and genetics as a major component. Here is a snapshot of five projects from the Animal Genetics Research Unit.

RESEARCH CAPABILITIES

- » We manage large-scale, pasture-based cattle and sheep breeding research facilities at Cowra, Glen Innes, Orange and Trangie, and animal house experimental facilities at Wagga Wagga and Armidale.
- » We have comprehensive laboratory facilities at some of these centres and at Menangle, for meat science, nutrition, molecular genetics and related work.
- » We have access to industry co-operator herds and flocks, commercial abattoirs, industry data and a comprehensive research database.
- » The specialty areas of our staff include quantitative and molecular genetics, growth and development, modelling and economics.
- » We work with extension officers to ensure adoption strategies are incorporated and implemented.
- » We have strong partnerships with key industry and research providers including livestock producers.

CONTACT US

For more information on our full portfolio please contact Dr Paul Arthur (02) 4640 6390 or paul.arthur@industry.nsw.gov.au.

PROJECT UPDATES

GENETICS & THE COLOUR OF LAMB MEAT (2007–2014)

INTRODUCTION: Retail meat colour is important both for consumers, who use it as a cue to assess the quality and freshness of red meat, and retailers, for whom meat discolouration reduces the display life of retail cuts and their subsequent value.

FINDINGS: Examination of records of oxy:met (a measure of browning of meat) and a* (meat redness) of sheep meat samples in a simulated retail display showed that these measures are under moderate genetic control. There is potential for genetic improvement of lamb meat colour stability during retail display.



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PARTNERS: Sheep CRC, AWI, MLA

EASY CARE SHEEP WITH SOFT, WHITE PHOTOSTABLE WOOL - POSSIBLE? (2007–2014)

INTRODUCTION: Breech strike is the major form of flystrike and smaller, finer woolled, single born ewes are particularly at risk. Surgical mulesing successfully reduces the incidence of breech strike however increasing animal welfare considerations have provided the impetus for the development of alternatives, including the use of genetics.

FINDINGS: Results from the initial analysis of data from several sheep flocks across Australia indicates that ‘easy care’ traits can be improved by genetic selection. Such selection would have a favourable response in liveweight, staple length, staple strength and stable wool colour. It would have no impact on wool production or clean colour, but increase fibre diameter.

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GENES THAT HELP CATTLE USE FEED EFFICIENTLY (2005–2012)

INTRODUCTION: Providing feed for cattle is the single most important input cost in beef production. Hence the efficiency of feed utilisation by cattle is an important profit driver and needs to be considered in genetic improvement strategies.

FINDINGS: Based on previous findings that feed efficiency is under genetic control and that efficient cattle have lower greenhouse gas emissions, recent research has focused on finding the actual genes responsible. Analysis of liver samples of cattle found four genes that are highly expressed in genetically high efficiency cattle and another nine genes that are highly expressed in low efficiency cattle. This is an exciting first step in developing simpler and cheaper gene markers for the identification of cattle genetically superior for feed efficiency.



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THE ECONOMIC COST OF FARM-RELATED FATALITIES IN AUSTRALIA (2008–2010)

INTRODUCTION: Farm-related fatalities are a significant issue for Australian agriculture, with 404 farm-related fatalities occurring over the period 2001-04. Very little is known about their cost to the Australian economy.

FINDINGS: Economic modelling of direct and indirect costs estimated the 404 fatalities cost the Australian economy \$650.6 million, in 2008 dollars. This equates to 2.7 per cent of the 2008 farm GDP due to potentially preventable farm accidents and injuries. The top five agents causing death (tractors, ATVs, drownings, utilities and 2 wheel motorcycles) accounted for exactly half of the fatalities and 47% (\$303.5 million) of the economic cost.



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DO BODY COMPOSITION CHANGES AFFECT MATERNAL PRODUCTIVITY OF COWS?

(2005–2012)

INTRODUCTION: Genetic selection has been successful in improving meat yield and efficiency in slaughter cattle. Such selection tended to have an impact on the body composition of the progeny. Beef cattle breeders are uncertain about the impact of these body composition changes on the maternal productivity of their cows.

FINDINGS: In a study involving over 6000 cows from two breeds weight, fatness and muscling were monitored over two breeding cycles. Initial findings indicate that the cows changed weight and composition substantially throughout the year but there were considerable differences in the size and direction of these changes between herds. However, change in weight over the annual production cycle is lowly heritable and more a result of management decisions than of selection.



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PIS&R PROJECT UPDATES