

Managing recessive genetic factors in the genomics era

University of Sydney

9th-10th May, 2011

From time to time, lethal recessive genetic factors have caused significant economic loss and disruption to the seedstock breeding programs of beef industries around the world, following widespread use of particular elite bloodlines. Almost inevitably, those bloodlines were later found to carry one or more lethal genetic mutations, after the resulting abnormal phenotypes appeared almost simultaneously in several different countries. An expected increase in selection pressure arising from improved accuracy in the identification of elite animals by genomic-assisted selection may exacerbate this problem. Conversely, genomic technologies also provide significant opportunities for more efficient control of emerging deleterious recessive genetic factors.

Currently, the critical requirements for more cost-effective reduction in economic loss from diseases caused by recessive genetic factors are (1) earlier identification of the resulting abnormal phenotypes, before the causal mutations become widespread in the population; and (2) development of low-cost diagnostic tests for identification of the heterozygous carriers that do not express the syndromes seen in homozygotes.

In the new genomics environment, past seedstock industry practices for management of undesirable recessive factors may not be optimal going forward. It may be possible to detect abnormal genotypes without prior detection of abnormal phenotypes, by genomic screening for major mutations, and other new or modified strategies might also be possible for minimising the impact of undesirable recessive factors.

WORKSHOP OBJECTIVE: The purpose of this workshop is to collate and integrate the perspectives of stakeholder groups in the beef industry and the international cattle genomics community on strategies for improved management of recessive genetic factors, including frontier technologies that might be deployed, identifying opportunities provided by new technology and likely best practice strategies for the future. The obvious interaction between new technology and the regulatory standards of breed associations for seed stock cattle registration is seen as central to this process. The workshop will bring together representatives of cattle seed stock industries (breed associations and semen distributors), research scientists in cattle genomics, veterinarians involved in detection and control of heritable defects and other stakeholders, from a number of countries involved in global distribution of beef genetics. Existing and potential new strategies for minimising impacts will be discussed and evaluated, identifying problems that limit adoption of identified future best practice strategies and developing a coherent plan for improvement, including R&D priorities.

WORKSHOP FORMAT: This is not a workshop for presentation of research results. The workshop will be run in the consensus development format, with short introductory “backgrounding” papers followed by structured discussion of the subject areas by a core group of invited participants, observed by the wider audience. Audience participation will be possible through access to computer terminals linked to a large screen where comments can be placed during the sessions and seen by the core group for further discussion later in the meeting as appropriate. An audience “scout” will also collect and collate written questions to put to the core panel. There will also be regular opportunities for questions from the audience in the usual manner. Members of the program committee (shown below) will be members of the core discussion group, together with other invited persons, and will chair the sessions.

International visitors to the SMOG conference in Melbourne are particularly welcome.

The Workshop is funded by Meat and Livestock Australia and supported by Angus Australia and the NSW Department of Industry and Investment.

Workshop Sessions will cover the following issues

1. The economic and genetic impacts of heritable recessive developmental defects and constraints to improvement of their management - history and current situation.
2. Technical opportunities and strategies for earlier recognition of emerging recessive defects and the preconditions and constraints to their effective implementation.
3. The impact of genomic selection methods on recessive defects in cattle and genomic opportunities for reducing these impacts.
4. Towards more consistent gains in beef cattle productivity from genetic improvement - balancing selection for production traits and selection against genetic defects.
5. An assessment of the effectiveness and collateral impact of alternative breed association rules for genetic defects and the development of "best practice" guidelines for these rules.
6. Strategies for global cooperation and coordination of continuous improvement in the detection and control of heritable recessive defects in cattle.

CORE PARTICIPANTS WHO HAVE ACCEPTED INVITATIONS (to date) (including PROGRAM COMMITTEE)

Prof. Jorgen Agerholm, Royal Vet and Ag University, Copenhagen, Denmark
Dr Robert Banks, Meat and Livestock Australia, Sydney Australia
Prof Jonathan Beever, University of Illinois, USA
Mr Bill Cornell, ABS Global, Australia
Dr Laurence Denholm, NSW Department of Industry and Investment, Australia
Dr Alison van Eenennaam, University of California, Davis, USA
Prof. Michael Goddard, University of Melbourne, Australia
Mr Alex McDonald, Australian Limousin Society, Australia
Emeritus Prof. Frank Nicholas, University of Sydney, Australia
Dr Peter Parnell, CEO, Angus Australia, Australia
Mr Bryce Schumann, CEO, American Angus Association, USA
Prof. David Steffan, University of Nebraska, USA
Prof. Jerry Taylor, University of Missouri, USA
Dr R Mark Thallman, USDA MARC, Nebraska USA
Dr Keith Walker, Meat and Livestock Australia, Sydney, Australia
Prof. Peter Windsor, University of Sydney, Australia
Mr Chris McIlroy, Agrigene Pty Ltd, Australia
Mr Tom Gubbins, Te Mania Angus, Australia

Further Information: Dr Laurence Denholm
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Registration: \$80 per day (includes lunch and morning and afternoon tea)
Registration is available via the Angus Australia website.

Conference Dinner: Evening of Monday 9th May 2011 - \$60 (optional, not included in registration fee). This is a three course meal with beverages included, to be held at the Grandstand Sports Bar and Function Centre overlooking Oval Number 1 of the University of Sydney Campus, about 500 metres from the Workshop Venue.

Suggested Accommodation:

(1) Rydges Camperdown Hotel Sydney,
9 Missenden Road Camperdown NSW 2050 Phone:+61 2 9516 1522
<http://www.rydges.com/hotel/RNCAMP/Rydges-Camperdown-Sydney.htm>

(2) The Haven Inn Sydney 2005, 196 Glebe Point Road Glebe, Ph: 61 2 9660 6655,
Fax: 61 2 9660 6279. <http://www.haveninnsydney.com.au/> (Both hotels are about 15
minutes easy walk to the workshop venue at Sydney University.)