National Program for the Genetic Improvement of Feed Efficiency in Beef Cattle

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20 investigators 10 institutions
Why Improve Efficiency?

- A feed efficiency improvement of approximately 10% (2 pound reduced RFI) across the entire feedlot sector would reduce feed costs $1.2 Billion in 2011 (Weaber, 2011)

- Fewer resources used = improved global food security, reduced footprint—Sustainability

Understanding the components of feed efficiency

- More efficient cattle may have improved digestion or metabolism of nutrients, or
- More efficient cattle may utilize absorbed nutrients more efficiently
What Impact Can (will) Genomics Have?

- Genomic information has the potential to increase accuracy
  - Proportional to %GV
  - Impacts inversely related to EPD accuracy
- Multiple trait selection is critical and could become more cumbersome
  - Economic indexes help alleviate this
  - Use index values that meet your breeding objective

The Project

- Up to 5 Year/$5M USDA NIFA funded project
  - April 1, 2011 to March 31, 2016
  - 2/3 fundamental and applied research
  - 1/3 extension and outreach
  - Demonstration project involves 24 collaborating producers and a commercial feedlot
Research Objectives

- Assemble DNA samples, individual FI, growth and carcass composition data for 8,000 animals representing 8 major beef breeds

<table>
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<th>3</th>
<th>4</th>
<th>5</th>
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<td>600 (UI)</td>
<td>200 (MU)</td>
<td>300 (MU)</td>
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<td>70 (WSU)</td>
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<td>1522</td>
<td>1222</td>
<td>972</td>
<td>672</td>
<td>7897</td>
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</tbody>
</table>

The Project

- Research objectives to improve beef cattle feed efficiency:
  - Genotyping will included high density (700 K) SNP or imputed from 50K
  - Develop national across-breed genomic selection program
  - Identify nutritionally driven (forage–concentrate) interactions
The Project

Research objectives to improve beef cattle feed efficiency:
◦ Evaluate the genetics of microbial population establishment and the effects on efficiency
◦ Identify genes controlling metabolism
◦ Efficiency differences associated with mitochondrial and nuclear genomes
◦ Detailed evaluation of high and low RFI cattle, including a repository of tissues for future analysis

Early results?

Extension Program Goals

◦ Highly integrated with research component
  ◦ Technology transfer
◦ Involves stakeholders early in the process
◦ Engages all segments of the industry
◦ Demonstrates progress in efficiency change by stakeholders by project conclusion
◦ Industry education component (tied to research results)
Extension Field Project

Field demonstration project will demonstrate utility of molecular EBVs for FE and component traits and “test drive” the technology

In seedstock herds:
- 50K MEBVs for WW in Y1
- MEBVs for feed intake/efficiency in Y3

2 Collaborators
4 Collaborators
7 Collaborators
4 Collaborators
1 Collaborator

Feedlot (2013)
Marker Assisted Management

AI Sires

2009 Born Females
Heifer stayability

AI & Herd Bulls sire 2010 calf crop in collaborator herds

AI 900 cows

Crossbred Steers
Rex Ranch (2011) & USMARC (2011 and 2012)

FE (2012)
FE (2012 & 2013)
Marker assisted management

- Identify nutrition or management by genetic interactions
- Determine practical sources of information
  - Reduced panel tests
  - Genetic information
- Management based on genetic knowledge
  - Nutrition and management
  - Sorting into outcome or management groups

Industry Feedback

- Advisory board that includes demonstration project participants, plus representatives of feedlot sector.
- Will meet annually to give feedback.
Resources Today

- www.beefefficiency.org
- Conference presentations
- Updates on NCBA’s Cattlemen–to–Cattlemen
  - Three segments filmed in 2011 and 2012 archived on website
- NCBA Cattlemen’s College 2012
  - Presentations archived on website
Look us up at the NCBA Trade Show Feb 6–9

To stay informed

Contact one of the team members, or

Click the "Contact Us" button on the website

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