



“Integrating DNA Information into Beef Cattle Production Systems”

Project Director:

Dr. Alison Van Eenennaam, University of California, Davis, CA

Collaborators:

Dr. Darrh Bullock, Extension Professor, University of Kentucky, KY

Dr. Leslie “Bees” Butler, Extension Marketing Specialist, UC Davis, CA

Dr. Daniel Drake, UC Cooperative Extension Livestock Advisor, CA

Dr. Dorian Garrick, Professor, Iowa State University, IA

Dr. John Pollak, Professor, Cornell University, NY

Dr. Mark Thallman, US Meat Animal Research Center, Clay Center, NE



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Research objectives of “Integrating DNA information into beef cattle production systems”

- GOAL: Incorporate DNA-based information into estimate of genetic merit
 1. Which of several incorporation methods is best?
 2. Which is feasible for commercial ranches to implement?
 3. Which provides economic benefit?
- **RESEARCH OBJECTIVE:** Compare the current means of genetic prediction (**bEPDs**) with
 1. whole-genome scan genetic predictions (molecular breeding values, **MBVs**),
 2. “commercial ranch” genetic evaluations (**rEPDs**) based on the actual performance of offspring under field conditions.



Ranch resources/collaborators on “Integrating DNA information into beef cattle production systems”

Four ranches on this project (UC Davis and
3 commercial cooperators in Siskiyou)

- Cowley 900 (550 Spring; 350 Fall) 30
- Kuck 500 (200 Spring; 300 Fall) 10
- Mole-Richardson 700 (Fall) 30
- UC Davis 300 (Fall) 10

*Approximately 80 Angus bulls, and 2,400
cows per year on project*

Happy Cows come from Siskiyou County



Cowley Ranch



Kuck Ranch



Mole-Richardson Ranch





UC Davis – Sierra foothills







Work flow and collaborators

- DNA on all bulls goes for whole genome scan – collaboration with **Jerry Taylor and John Pollak**
- Molecular breeding value (MBV) prediction of genetic merit based on MARC training data set – collaboration with **Dorian Garrick and U.S. Meat Animal Research Center**
- Ranch data including sire groupings, birth dates and weaning weights on all calves, all EIDed, and “DNAed” for parentage determination – collaboration with **Dan Drake and producers**
- Steer feedlot in weights, treatments, and carcass traits (Hot weight, grading information and meat sample collected in the processing plant – collaboration with **Harris Ranch**
- Compile data and compare three sources of genetic estimates: breed EPDs (bEPDs), commercial ranch EPDs (rEPDs), and MBVs
- All data stored on Cornell database for use in validation studies



Ranch records on ~ 7000 calves, feedlot and carcass records on ~ 3500 steers representing ~ 100 Angus bulls.

Breeding Season:	Spring 2008	Fall 2008	Spring 2009	Fall 2009	Spring 2010	Fall 2010
Calving Season:	Spring 2009	Fall 2009	Spring 2010	Fall 2010	Spring 2011	Fall 2011
Weaning/Sampling Season:	Fall 2009	Summer 2010	Fall 2010	Summer 2011	Fall 2011	Summer 2012
Slaughter :	May 2010	January 2011	May 2011	January 2012	May 2012	January 2013

<u>Weaning Samples</u>	Cowley	Kuck	Parker	Davis	SUM	TOTAL # FOR TRIAL
Fall 2009	550	200 (September)			750	
Summer 2010	350	300 (May/June)	700 (1st week July 2010)	250	1600	
Fall 2010	550	200 (September)			750	
Summer 2011	350	300 (May/June)	700 (1st week July 2011)	250	1600	
Fall 2011	550	200 (September)			750	
Summer 2012	350	300 (May/June)	700 (1st week July 2012)	250	1600	
TOTAL CALF SAMPLES						7050

<u>Meat Samples through Harris</u>						
Fall 2008 (January 14th, 2009)	180 (Jan 09)				180	
Spring 2009 (May)	244 (May 09)				244	
Fall 2009 (January , 2010)	180 (Jan 10)				180	
Spring 2010	250 (May 10)	100 (July)			350	
Fall 2010	175 (Jan 11)	150 (March/April)	350 (Jan-late March 11)		675	
Spring 2011	250 (May 11)	100 (July)			350	
Fall 2011	175 (Jan 12)	150 (March/April)	350 (Jan-late March 12)		675	
Spring 2012	250 (May 12)	100 (July)			350	
Fall 2012	175 (Jan 13)	150 (March/April)	350 (Jan-late March 13)		675	
TOTAL HARRIS MEAT SAMPLES						3679



Extension objectives of "Integrating DNA information into beef cattle production systems"

The **extension objective** is to develop and deliver educational materials to a national audience on the integration of DNA information into beef cattle selection programs.

- Includes the development of fact sheets, national educational programs including program at BIF 2009, brown bagger series, popular press articles, and in year 4 a stakeholder workshop entitled "*Integrating DNA information into beef cattle production systems*"



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USDA Integrated Grant Collaborators

- Dr. Darrh Bullock, Extension Professor, University of Kentucky, KY
- Dr. Leslie “Bees” Butler, Extension Marketing Specialist, UC Davis, CA
- Dr. Daniel Drake, University of California Cooperative Extension Livestock Advisor, CA
- Dr. Dorian Garrick, Professor, Iowa State University, IA
- Dr. John Pollak, Professor, Cornell University, NY
- Dr. Mark Thallman, US Meat Animal Research Center, Clay Center, NE

Graduate Students

- Kristina Weber, Ph.D. Candidate, UC Davis, CA and Krista Coopridner, MS Candidate, UC Davis, CA

Producer Collaborators:

- Jack Cowley, Cowley Rancher, Siskiyou County, CA
- Dale, Greg, and Richard Kuck, Kuck Ranch, Siskiyou County, CA
- Matt Parker, Mole-Richardson Ranch, Siskiyou County, CA

Processor Collaborators:

- Harris Ranch Beef Company, Coalinga, CA
- Los Banos Abattoir, Los Banos, CA

Software Collaborators:

- Jim Lowe, Cow Sense Herd Management Software, NE

Other Contributors/Collaborators

- Dr. Jerry Taylor, University of Missouri, MO
- Dr. Mike Goddard, University of Melbourne and Victorian DPI, Australia