

WERA-1
June 16-17, 2010

In attendance: M. Cronin (U. Alaska)*, J. Rumph (Pfizer)*, M. Thomas (NMSU)*, M. Enns (CSU)*, C. Gaskins (WSU)*, D. Crews (CSU)**, M. MacNeil (ARS-Miles City)*, B. Hess (UW)***, B. Golden (UC-SLO)**, S. Newman (PIC)**, A. Herring (TAMU)*, K. Cammack (UW)*, Steward Taylor (UNR)**, Brent Buckley (UH; phone in)**.

*Member

**Invited guest

***Administrator

Meeting Notes – Weds., June 16.

Overview / review of objectives: Milt Thomas

Objective 1. Develop, disseminate, and maintain resources on the genetics of beef cattle to support outreach, extension, and education activities.

Objective 2. Maintain animal populations, DNA repositories, and performance databases to support beef cattle phenomics research.

Objective 3. Integrate quantitative and molecular research tools that contribute to the understanding of genetic associations among economically important traits and their indicators.

Objective 4. Exchange information, discuss research results, plan new research, examine new developments, discuss future problems, plan cooperative research and share ideas for interdisciplinary involvement in beef cattle breeding.

- Objective 1. Develop, disseminate, and maintain beef cattle genetics resources.
 - Website – Changed to a FaceBook account (relative to dissemination).
 - Update on Breed Association involvement (Milt, Mark, Denny).
 - Petition to be e-mailed.
 - Add on-line courses to list of classes taught.
- Objective 2. DNA Repositories, etc.
 - Milt will take charge of this. Create new spreadsheet and gather numbers.
 - Should be sent out by August/September.
 - Data sharing.
 - IP issues – overview by MacNeil.
 - Possibility of whole-genome rep. to improve sharing ability.
- Objective 3. Integrate quantitative and molecular research tools.
 - Update on projects integrated research (quantitative + molecular).
 - Short courses (CSU, ISU).
 - More with Station Reports.
- Objective 4. Overarching goals of group.

Update from Bret Hess.

- USDA / NIFA Update.
- Representative - Send report to.
- Major change to NIFA.
- Comments to NIFA and listening sessions.
- AFRI Program \$400-500M 2010-2011 (no expected influx for next year – back to \$80M-100M).

Project approval (Start date: Oct. 1, 2008 – Sept. 30, 2013)

Plan posted on NIMMS site (reports, too).

Report: Participants

Minutes

Accomplishments

- Activities (organized specific functions / duties /teams)
- Outputs (publications (also graduate students, presentations, courses/education, etc.)
- Short-term outcomes (quantitative and quantifiable measures)
- Impact statements (economic and behavioral changes)
 - e.g. trait improvement

\$40 registration fee. (To Mark Enns).

Symposium for Charlie Gaskins (retired member).

Meeting Notes – June 17.

Station Reports:

- Milt Thomas (NMSU)
 - NMSU Gerald W. Thomas Chair – 1 year appointment.
 - McMaster's Fellowship + CSIRO
 - Overview of Chair interview.
 - Research:
 - Relationship of beef cow size to fertility.
 - Relationship of dairy cow milk production level to fertility.
 - Bayesian QTL inference and gene identification for first service conception rate in Brangus heifers.
 - SNP50 chip; Bayes C analysis.
 - QTL detection = SNPlotZ=GBrowse
 - Hypothalamic expression of candidate genes

Recent publications:

- P. Luna-Nevarez, D.W. Bailey, C.C. Bailey, D.M. VanLeeuwen, R.M. Enns, G.A. Silver, K.L. DeAtley, and M.G. Thomas. 2010. Growth characteristics, reproductive performance, and evaluation of their associative relationship in Brangus cattle managed in a Chihuahuan Desert production system. *J. Anim. Sci.* 88:1891-1904.
- D.W. Bailey, M.G. Thomas, J.W. Walker, B.K. Witmore, and D. Tolleson. 2009. Effect of previous grazing patterns and diet selection of Brangus cows in the Chihuahuan Desert. *Range Ecol. Manage.* 62:223-232.
- K.M. Cammack, M.G. Thomas, and R.M. Enns. 2009. Review: reproductive traits and their heritabilities in cattle. *Prof. Anim. Sci.* 25:517-528.
- M.G. Thomas, M. Amstalden, D.M. Hallford, G.A. Silver, M.D. Garcia, D.H. Keisler, and G.L. Williams. 2009. Dynamics of GHRH in third-ventricle cerebrospinal fluid of cattle: relationship with serum concentrations of GH and responses to appetite-regulating peptides. *Domest. Anim. Endocrinol.* 37:196-205.
- T. Smith, M.G. Thomas, T.D. Bidner, J.C. Paschal, and D.E. Franke. 2009. Single nucleotide polymorphisms in Brahman steers and their association with carcass and tenderness traits. *Genet. Mol. Res.* 8:39-46.
- K.L. DeAtley, G. Rincon, C.F. Farber, J.F. Medrano, P. Luna, R.M. Enns, G.A. Silver, D. VanLeeuwen, and M.G. Thomas. Genetic analyses involving microsatellite ETH10 on bovine chromosome 5 and performance trait measures in Angus and Brahman-influenced cattle. To be submitted *J. Anim. Sci.* 2010.

Invited academic and extension efforts:

M. Thomas continues effort as Chair of the IBBA Breed Improvement Committee ad-hoc group known as DNA technology committee changed to a task force. Effort becoming much more strategic and educational. How do we incorporate genetic markers into a multi-breed EPD?

Branch Ranch, Lovington, NM. Developing DNA paternity testing program and within herd EPD system for an organization of 5 cow-calf operations and a feedlot. Assisting with NMSU-Ag Marketing project for Branch Ranch-Natural Beef of NM, LLC.

- Andy Herring (TAMU)
 - Evaluation of genetic variability in immune responses to BVDV.
 - Characterize multiple phenotypes associated with response to BVDV challenge.
 - Evaluation of cow productivity traits in McGregor Genomics Project.
 - Genes affecting cow productivity traits.
 - Genes with effects on carcass traits, efficiency, etc.
 - Cattle epigenetics project.
 - Joint international study (w/ Queensland and Adelaide).
 - *Bos indicus* x *Bos taurus* crosses.
 - MPRC (NRC-based residual feed intake) – Angus x Nellore crosses.
 - Epigenetic aspect of temperament.
 - 5 QTL for temperament.
 - Prenatal and postnatal gene identification and expression.

Recent publications:

Peer reviewed articles

- Rhoades, R.D., C.H. Ponce, S.B. Smith, A.D. Herring, L.O. Tedeschi, D.K. Lunt, D.T. Dean, F.R.B. Ribeiro, C.W. Choi, D.G. Riley, and J.E. Sawyer. 2009. Evaluation of growth-based predictions of carcass fat and marbling at harvest using ultrasound measurements. *Prof. Anim. Sci.* 25: 434-442.
- Kochan, K.J., R.N. Vaughn, T.S. Amen, C.A. Abbey, J.O. Sanders, D.K. Lunt, A.D. Herring, J.E. Sawyer, C.A. Gill and P.K. Riggs. 2009. Expression of mitochondrial respiratory complex genes in liver tissue of cattle with different feed efficiency phenotypes. *Proc. Assoc. Advmt. Anim. Breed. Genet.* 18:175-178.

Editor reviewed/proceedings papers

- Burns, B.M., S. Hiendleder and A.D. Herring. 2009. Precision beef cattle production through an alternative genetic approach. *The Australian Cattle Veterinarian, March, 2009, 50:14-16.*
- Burns, B.M., A.D. Herring, and S. Hiendleder. 2010. Precision beef cattle production through an alternative genetic approach. Pan Pacific Veterinary Conference, Australian Veterinary Association and New Zealand Veterinary Association, Brisbane 23-28 May 2010.

Abstracts

- B.M. Burns, A.D. Herring, G. Fordyce, S. Hiendleder, and A. Laing. 2010. Unrecognized variation in gestation length and birth weight of Droughtmaster calves produced through fixed-time AI. 8th International Ruminant Reproduction Symposium, Sept 3-7, Anchorage, AK.
- Runyan, C. A., A. D. Herring, J. F. Ridpath, M. S. Cabaniss, C. T. Muntean, J. E. Sawyer. 2010. Health measures in beef steers of known genetic background following BVDV challenge. *J. Anim. Sci. (Suppl. X): 2(Abstr.) Southern Section ASAS Feb. 6-9, Orlando.*
- Runyan, C. A., A. D. Herring, J. F. Ridpath, M. S. Cabaniss, C. T. Muntean, J. E. Sawyer. 2010. Feed intake and weight gain in beef steers of known genetic background following BVDV challenge. *J. Anim. Sci. (Suppl. X): 2(Abstr.) Southern Section ASAS Feb. 6-9, Orlando.*
- Cooper, A.J., J.O. Sanders, A.D. Herring, C.A. Gill, D.K. Lunt, and J.E. Sawyer. 2009. Evaluation of birth weight, weaning weight, and gestation length in *Bos indicus/Bos taurus* cross calves. *J. Anim. Sci.* 87(E-Suppl. 3):2(Abstr.).
- Gladney, C.J., A.D. Herring, J.O. Sanders, D.K. Lunt, and C.A. Gill. 2009. Evaluation of calf size and growth, udder and teat characteristics, and reproduction in young *Bos indicus-Bos taurus* cows. *J. Anim. Sci.* 87(E-Suppl. 3):3(Abstr.).
- Runyan, C.A., A.D. Herring, J.E. Sawyer, W.J. Horne and J.F. Ridpath. 2009. Evaluation of performance and immune response in steers of known background challenged with bovine viral diarrhea (BVD) virus. *J. Anim. Sci.* 87(E-Suppl. 3):27(Abstr.).

Extension Activities

Genetic and management tools for beef quality. BEEF 706. August 12, 2009. College Station; 40 participants.

Genetic and management tools for beef quality. BEEF 706. August 14, 2009. College Station; 40 participants.

Coordinator and moderator of Beef Cattle Research in Texas session of 54th TAMU Beef Cattle Short Course, August 3, 2009; 105 participants.

- Matt Cronin (Alaska)
 - Feral cattle on Chirikof Island
 - Taxonomy and Systematics
 - Wood bison and Plains bison subspecies. Phylogenetic analysis (K-casein).
 - Visiting scientist – ARS Miles City (MacNeil).
 - Assessing relationships of species, subspecies, and populations, and identification of management units.
 - Polar bears (mtDNA of bear species).
 - Endangered species update.

Recent publications:

Cronin, M.A. and L.D. Mech. 2009. Problems with the claim of ecotype and taxon status of the wolf in the Great Lakes region. *Molecular Ecology* 18:4991-4993.

Cronin, M.A., S.C. Amstrup, S. Talbot, K. Sage, and K.S. Amstrup. 2009. Genetic variation, relatedness, and effective population size of polar bears (*Ursus maritimus*) in the Beaufort Sea, Alaska. *The Journal of Heredity* 100:681-690.

Cronin, M.A., L.A. Renecker, and J.C. Patton. 2009. Genetic variation in domestic and wild elk (*Cervus elaphus*). *Journal of Animal Science* 87:829-834.

Cronin, M. A. 2007. Limitations of molecular genetics in conservation. *Nature* Vol. 447 no 7145:638.

Cronin, M. A. 2007. The Preble's meadow jumping mouse: subjective subspecies, advocacy and management. *Animal Conservation* 10:159-161.

MacNeil, M.D., M.A. Cronin, H.D. Blackburn, C.M. Richards, D. R. Lockwood, and L. J. Alexander. 2007. Genetic Relationships between feral cattle from Chirikof Island, Alaska and other breeds. *Animal Genetics* 38:193-197.

Cronin, M. A., M. D. MacNeil, and J. C. Patton. 2006. Mitochondrial DNA and microsatellite DNA variation in domestic reindeer and relationships with wild caribou. *Journal of Heredity* 97:525-530.

- Mike MacNeil (ARS-Miles City, MT)
 - Overview of ongoing projects / personnel (including graduate students).
 - Line 1 project (world populations).
 - Objectives:
 - Characterization of rumen microbial populations.
 - Using shotgun sequencing.
 - Determination of rumen microbial and host genetic effects – heifer efficiency.

- Determination of phenotypic and genetic relationships early measures of feed intake, growth, and body composition with later reproduction and lifetime productivity.
- Determination of *in utero* nutrition on epigenetic effects.
- Development and validation of appropriate phenotypes for fertility measures.
- Identification and fine-mapping of QTL affecting feed intake, growth, and reproduction traits.

Recent publications:

- M. D. MacNeil, M. D., S. L. Northcutt, R. D. Schnabel, D. J. Garrick, B.W. Woodward, J. F. Taylor. 2010. Genetic correlations between carcass traits and molecular breeding values in Angus cattle. Proc. World Cong. Genet. Appl. Livestk. Prod. (in press).
- MacNeil, M. D., J. D. Nkrumah, B. W. Woodward, S. L. Northcutt. 2010. Genetic evaluation of Angus cattle for carcass marbling using ultrasound and genomic indicators. J. Anim. Sci. 88:517-522.
- Liu G. E.1, Y. L. Hou, B. Zhu, M. F. Cardone, L. Jiang, A. Cellamare, A. Mitra, L. J. Alexander, L. L. Coutinho, M. E. Dell'Aquila, L. C. Gasbarre, G. Lacalandra, R. W. Li, L. K. Matukumalli, D. Nonneman, L.C.D. Regitano, T.P.L. Smith, J. Z. Song, T. S. Sonstegard, C. P. Van Tassell, M. Ventura, E. E. Eichler, T. G. McDanel, J. W. Keele. 2010. Analysis of copy number variations among diverse cattle breeds. Genome Res. 20:693-703.
- Jiang Z. H., J. J. Michal, J. Chen, T. F. Daniels, T., M. D. Garcia, C. T. Gaskins, J. R. Busboom, L. J. Alexander, R. W. Wright, M. D. MacNeil. 2009. Discovery of novel genetic networks associated with 19 economically important traits in beef cattle. Internat. J. Biol. Sci. 5:528-542.
- Marquez, G. C. R. M. Enns, M. D. Grosz, L. J. Alexander, M. D. MacNeil . 2009. Quantitative trait loci with effects on feed efficiency traits in Hereford x composite double backcross populations. Anim. Genet. 40:986-988.
- MacNeil, M. D. 2009. Invited Review: Research contributions from seventy-five years of breeding Line 1 Hereford cattle at Miles City, Montana. J. Anim. Sci. 87:2489-2501.
- Bovine Genome Sequencing & Analysis Consortium. 2009. The Genome Sequence of Taurine Cattle: A Window to Ruminant Biology and Evolution. SCIENCE 324:522-528.
- Alexander, L. J., L. A. Kuehn, T. P.L. Smith, L.K. Matukumalli, B. Mote, J. E. Koltz, J. Reecy, T. W. Geary, D. C. Rule, M. D. MacNeil. 2009. A Limousin specific myostatin allele affects longissimus muscle area and fatty acid profiles in a Wagyu-Limousin F-2 population. J. Anim. Sci. 87:1576-1581.

- Mark Enns (CSU)
 - Update on budget.
 - Center for Genetic Evaluation of Livestock.
 - 20+ breeds (Background research; production EPD analysis).
 - Animal Breeder's Tool Kit revisions (Version 3.0).
 - The DSS (complete re-write).
 - GrowSafe system
 - 6 pens with 4 nodes each (35 hd capacity per pen).

- Each pen equipped with effluent run-off measurement channel.
- Genetics of Feedlot Health.
- Susceptibility/resistance to disease.
- Collection of phenotypic data.
- BRD / # treatments summary (performance + carcass traits).
- Treated vs. non-treated – Lung damage.
- Heritabilities estimated (~15%).

Recent publications:

- Crews, D. H., Jr., G. E. Carstens, R. A. Hill, J. A. Basarab, and M. Nielsen. 2009. Individual feed intake and utilization measurement. *In: Guidelines for Uniform Beef Improvement Programs, 9th Edition.* Beef Improvement Federation (www.beefimprovement.org).
- Enns, R. M. 2010. Selections Decisions: Tools for economic improvement beyond EPD, Chapter 8 in the Sire Selection Manual, 2nd Edition, National Beef Cattle Evaluation Consortium. Pp. 42-49.
- Enns, R. M. 2010. The Role of economically relevant and indicator traits, Chapter 4 in the Sire Selection Manual, 2nd Edition, National Beef Cattle Evaluation Consortium. Pp. 17-20.
- Islam, K. K., M. Vinsky, R. E. Crews, E. Okine, S. S. Moore, D. H. Crews, Jr., and C. Li. 2009. Association analyses of a SNP in the promoter of IGF-1 with fat deposition and carcass merit traits in hybrid, Angus, and Charolais beef cattle. *Animal Genetics* 40(5):766-769.
- Lancaster, P. A., G. E. Carstens, D. H. Crews, Jr., T. H. Welsh, Jr., T. D. A. Forbes, D. W. Forrest, L. E. Tedeschi, R. D. Randel, and F. M. Roquette. 2009. Phenotypic and genetic relationships of residual feed intake with performance and ultrasound carcass traits in Brangus heifers. *Journal of Animal Science* 87:3887-3896.
- Lawrence, P., M. McGee, D. A. Kenny, D. H. Crews, Jr., and B. Earley. 2009. Grass silage intake, rumen and blood variables, ultrasound and body measurements and behavior in pregnant beef heifers differing in phenotypic residual feed intake. 2009 Agricultural Research Forum, Tullamore, County Offaly, Ireland (Abstract).
- Lewis, R. M., B. B. Lockee, M. S. Ames, G. C. Marquez, R. M. Enns, J. M. Rumph, T. W. Wilkinson, and E. J. Pollak. 2009. Solving a dilemma in graduate education: *Animal Breeding and Genetics Online. J. Anim. Sci. E-Suppl. 2, Vol 87: 531* (Abstract).
- Mujibi, F. D. N. and D. H. Crews, Jr. 2009. Genetic parameters for calving ease, gestation length and birth weight in Charolais cattle. *Journal of Animal Science* 87:2759-2766.
- Weaber, R. L., and R. M. Enns. 2009. Managing genetic antagonisms between economically important beef production traits and marbling. *J. Anim. Sci. E-Suppl. 2, Vol 87: 185* (Abstract).
- Marquez, G. C., R. M. Enns, M. D. Grosz, L. J. Alexander and M. D. MacNeil. 2009. Quantitative trait loci with effects on feed efficiency traits in Hereford x composite double backcross populations. *Animal Genetics*. DOI: 10.1111/j.1365-2052.2009.01946x. 3 pages.

Marquez, G. C., S. E. Speidel, R. M. Enns and D. J. Garrick. 2010. Genetic diversity and population structure of American Red Angus cattle. *J. Anim. Sci.* 88:59-68.

- Kristi Cammack (UW)
 - Update on GrowSafe projects at SAREC.
 - 8 node system.
 - Bull test (Hereford test).
 - Upcoming heifer tests.
 - UW Herd – crossbreeding system initiated.

Recent publications:

Cockrum, R.R., K.J. Austin, J.W. Kim, J.R. Garbe, S.C. Fahrenkrug, J.F. Taylor and **K.M. Cammack**. 2010. Differential gene expression of ewes lowly tolerant and highly tolerant to elevated dietary nitrate. *J. Anim. Sci.* In press.

Rustemeyer, S.M., W.R. Lamberson, D.R. Ledoux, G.E. Rottinghaus, D.P. Shaw, R.R. Cockrum, K.L. Kessler, K.J. Austin and **K.M. Cammack**. 2010. Effects of dietary aflatoxin on health and performance of growing barrows. *J. Anim. Sci.* In press.

Cammack, K.M., C.L. Wright, K.J. Austin, P.S. Johnson, R.R. Cockrum, K.L. Kessler and K.C. Olson. 2009. Effects of high-sulfur water and clinoptilolite on health and growth performance of steers fed forage-based diets. *J. Anim. Sci.* 88:1777-1785.

Cockrum, R.R., K.J. Austin, P.A. Ludden and **K.M. Cammack**. 2009. Effects of subacute dietary nitrate on health and production of Suffolk ewes. *Animal.* 4:702-708.

Cammack, K.M., M. Thomas and M. Enns. 2009. Genetic analysis of reproduction traits in livestock: a review. *PAS.* 25:517-528.

Recent abstracts:

Hepatic gene expression in swine administered dietary aflatoxin B1. 2010. S.M. Rustemeyer, W.R. Lamberson, D.R. Ledoux, K. Wells, and **K.M. Cammack**. 9th World Congress on Genetics Applied to Livestock Production. Accepted.

Renin message is up-regulated in spermatogonia and testes of male mice in response to treatment with aflatoxin B1. 2010. K.J. Austin, K.L., Speiser, A.M. Kaiser, R.R. Cockrum, and **K.M. Cammack**. *J. Anim. Sci.* Accepted.

Determination of intrinsic tolerance to high dietary nitrate in ewes using hepatic gene expression. 2010. R.R. Cockrum, K.J. Austin, and **K.M. Cammack**. *J. Anim. Sci.* Accepted.

Changes in hepatic gene expression in steers administered high-S water with or without supplemental Mo. 2010. K.L. Kessler, K.C. Olson, C.L. Wright, K.J. Austin, and **K.M. Cammack**. *J. Anim. Sci.* Accepted.

Gene expression in amygdale of low sexually-performing rams: Are rams practicing abstinence? 2010. A.M. Fuller, K.J. Austin, V.A. Uthlaut, **K.M. Cammack**, and B.M. Alexander. SBN. Accepted.

Effects of dietary aflatoxin on performance and hepatic gene expression in swine. 2010. S.M. Rustemeyer, W.R. Lamberson, D.R. Ledoux, K. Wells, and **K.M. Cammack**. *J. Anim. Sci.* In press.

Effect of supplemental molybdenum on forage-fed steers receiving high-sulfur water. 2010. K.L. Kessler, K.C. Olson, C.L. Wright, K.J. Austin, P.S. Johnson, and **K.M. Cammack**. J. Anim. Sci. In press.

Differential gene expression of ewes highly tolerant and lowly tolerant to elevated dietary nitrate. 2010. R.R. Cockrum, K.J. Austin, J.R. Garbe, S.C. Fahrenkrug, J.F. Taylor, and **K.M. Cammack**. Plant & Animal Genomes XVIII Conference. In press.

Motion by Milt – Chairperson follow alphabetical order (by organization). Secretary previous host/chair. 2nd Mark. Approved.

Alaska – Proposed next location. June. Palmer campus.

- Alaska – Chair and host
- Colorado State – Secretary

Motion: Milt, 2nd Andy, Approved.

States participating: AK, AL, CA, CO, HA, MI, MT, NMSU, TAMU, WSU, UW.

Other Submitted Station Reports:

WERA-01
2010 Annual Progress Report: Washington State University

Period Covered: 2009-2010

Personnel: C.T. Gaskins, Z. Jiang, H.L. Neibergs

Current Collaborative Projects:

- Wagyu EPDs – CTG
- Identification of candidate genes for fat deposition and fatty acid composition in beef cattle – ZJ, CTG
- Genomic standardized farming for high quality beef to benefit Washington agriculture and human health – ZJ
- Genome-wide DNA marker information transfer from cow to buffalo – ZJ
- Johne's disease – HLN
- BVD/BRD – HLN
- Wagyu diversity – HLN
- Residual feed efficiency and mitochondrial function – HLN

Recent publications:

Zanella, R., M.L. Settles, S.D. McKay, R.D. Schnabel, J.F. Taylor, T. Fyock, R.H. Whitlock, Y. Schukken, J.S. Van Kessel, J.S. Karns, E. Hovingh, J.M. Smith, H.L. Neibergs. Identification of Loci Associated with Tolerance to Johne's Disease in Holstein Cattle. Animal Genetics (in press).

Decker, J.E., J.C. Pires, G.C. Conant, S.D. McKay, M.P. Heaton, K. Chen, A. Cooper, J. Vilkki, C.M. Seabury, A.R. Caetano, G.S. Johnson, R.A. Brenneman, O. Hanotte, L.S. Eggert, P.

- Wiener, J.-J. Kim, K.S. Kim, T.S. Sonstegard, C.P. Van Tassell, H.L. Neiberger, J.C. McEwan, R. Brauning, L.L. Coutinho, M.E. Babar, G.A. Wilson, M.C. McClure, M.M. Rolf, J.W. Kim, R.D. Schabel, J.F. Taylor. Resolving the evolution of extant and extinct ruminants with high-throughput phylogenomics. 2009. Proceedings National Academy of Science, USA. www.pnas.org/cgi/doi/10.1073/pnas.0904691106
- Settles, M., R. Zanella, S.D. McKay, R.D. Schnabel, J.F. Taylor, T. Fyock, R.H. Whitlock, Y. Schukken, J.S. Van Kessel, J. Karns, E. Hovingh, J.M. Smith, H.L. Neiberger. A whole genome association analysis identifies loci associated with *Mycobacterium avium* subsp. *paratuberculosis* infection status in US Holstein cattle. 2009. Animal Genetics. 40:655-662
- Michelizzi VN, Dodson MV, Pan ZX, Amaral ME, Michal JJ, McLean DJ, Womack JE, Jiang Z. 2010. Water buffalo genome science comes of age. International Journal of Biological Sciences 6: 333-349.
- Dodson MV, Vierck JL, Hausman GJ, Guan LL, Fernyhough ME, Poulos SP, Mir P, Jiang Z. 2010. Examination of adipose depot-specific PPAR moieties. Biochemical and Biophysical Research Communications 394:241-242.
- Chen J, Dodson MV, Jiang Z. 2010. Cellular and molecular comparison of redifferentiation of intramuscular- and subcutaneous- adipocyte derived progeny cells. International Journal of Biological Science 6:80-88.
- Dodson MV, Guan LL, Fernyhough ME, Mir PS, Bucci L, McFarland DC, Novakofski J, Reecy JM, Ajuwon KS, Thompson DP, Hausman GJ, Benson ME, Bergen WG, Jiang Z. 2010. Perspectives on the formation of an interdisciplinary research team. Biochemical and Biophysical Research Communications 391:1155-1157.
- Dodson MV, Jiang Z, Chen J, Hausman GJ, Guan LL, Novakofski J, Thompson DP, Lorenzen CL, Fernyhough ME, Mir P, Reecy JM. 2010. Allied industry approaches to alter intramuscular fat content and composition in beef animals. Journal of Food Science 75:R1-8.
- Kunej T, Wu X-L, Michal JJ, Milosevic-Berlic T, Jiang Z, Dovic P. 2009. The porcine mitochondrial transcription factor A gene: molecular characterization, radiation hybrid mapping and genetic diversity among 12 pig breeds. American Journal of Animal and Veterinary Sciences 4: 129-135.
- Jiang Z, Michal JJ, Chen J, Daniels TF, Kunej T, Garcia MD, Gaskins CT, Busboom JR, Alexander LJ, Wright Jr. RW, MacNeil MD. 2009. Discovery of novel genetic networks associated with 19 economically important traits in beef cattle. International Journal of Biological Sciences 5:528-542.
- Daniels TF, Killinger KM, Michal JJ, Wright Jr. RW, Jiang Z. 2009. Lipoproteins, cholesterol homeostasis and cardiac health. International Journal of Biological Sciences 5:474-488.
- Chen J, Guridi M, Fernyhough ME, Jiang Z, Guan LL, Hausman GJ, Dodson MV. 2009. Initial differences in lipid processing leading to pig- and beef-derived mature adipocyte dedifferentiation. Basic and Applied Myology 19:243-246.

Book and Book chapters:

- Neiberger, H.L., R. Zanella. Genomics of reproductive diseases in cattle and swine *in* Reproductive Genomics in Domestic Animals. Z. Jiang and T. Ott, editors. Wiley-Blackwell, Ames, IA (2010) pp 99 - 127.

Jiang Z, Ott TL (Eds). 2010. Reproductive Genomics in Domestic Animals. Wiley-Blackwell publishing.

Jiang Z, Williams GA, Chen J, Michal JJ. 2010. Mitochondriomics of reproduction and fertility. In: Jiang and Ott, editors. Reproductive Genomics in Domestic Animals. Wiley-Blackwell, Ames, IA, pp157 - 179.

Abstracts:

Neibergs, H.L., R. Zanella, J.F. Taylor, C.T. Gaskins, J.J. Reeves, J.M. deAvila. Estimation of inbreeding and effective population size of fullblood Wagyu cattle registered with the American Wagyu Association. 2010. Joint American Dairy Science Association-American Society of Animal Science Annual Meeting, Denver, Colorado.

Zanella, R., J. Wenz, E. Casas, J.S. Neibergs, D. Moore, H.L. Neibergs. Identification of genetic regions associated with bovine viral diarrhea persistent infection cattle. 2010. Joint American Dairy Science Association-American Society of Animal Science Annual Meeting, Denver, Colorado.

Neibergs, H.L. Advancing towards functional genomics. 2010. Joint American Dairy Science Association-American Society of Animal Science Annual Meeting, Denver, Colorado.

Neibergs, J.S., H.L. Neibergs, J. Wenz, D. Moore. Economic analysis of persistently infected bovine viral diarrhea disease prevalence in Washington beef herds. 2010. Joint American Dairy Science Association-American Society of Animal Science Annual Meeting, Denver, Colorado.

Neibergs, H.L., Y. Schukken, R.H. Whitlock, A. Pradhan, J.M. Smith, E. Hovingh. Evaluation of an interaction between *Mycobacterium avium* subspecies *paratuberculosis* strains and a locus associated with tissue infection. 2010. Joint American Dairy Science Association-American Society of Animal Science Annual Meeting, Denver, Colorado.

Wenz, J.R., D.A. More, H.L. Neibergs, J.S. Neibergs. Results from the Washington state bovine viral diarrhea virus voluntary control project. 2010. Joint American Dairy Science Association-American Society of Animal Science Annual Meeting, Denver, Colorado.

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Settles, M., R.H. Whitlock, J.F. Taylor, H.L. Neibergs. Identification of candidate genes for tissue infection of *Mycobacterium avium* subspecies *paratuberculosis* using single nucleotide polymorphism-based gene-set enrichment analysis (GSEA-SNP). 2010. Plant & Animal Genome XVIII, San Diego, California.

Pan ZX, Michal JJ, Gaskins CT, Reeves JJ, Bauck S, Jiang Z. 2010. SNP-based parentage assignment with different software/programs in beef cattle. PAG XVIII. San Diego, USA.

Jiang Z, Michal JJ, Chen J, Daniels TF, Kunej T, Garcia MD, Gaskins CT, Busboom JR, Alexander LJ, Wright Jr. RW, MacNeil MD. 2010. Discovery of novel genetic networks associated with 19 economically important traits in beef cattle. PAG XVIII. San Diego, USA.

**University of Arizona V Bar V Ranch
Wera-1 Annual Report
June, 2010**

Ranch Personnel: David W. Schafer
Keith G. Cannon
Debra L. Pearson
Wade W. Woodbury
Margaret M. Woodbury
Doug Tolleson
John Kava

Researchers: S. Peder Cuneo
John A. Marchello
Jim E. Sprinkle

Feedlot Personnel: James English
Keith O. Cannon

Graduate Students: R. Dean Fish

Current Projects:

- Evaluation of composite and/or purebred cow productivity and profitability under stressful environmental conditions and subsequent progeny performance in the feedlot.
 - D.W. Schafer and J.A. Marchello.
- Effects of a long-acting, trace mineral, reticulorumen bolus on range beef cow productivity and performance.
 - J.E. Sprinkle, S.P. Cuneo, R.M. Enns and D.W. Schafer.

Recent publications:

Ojha, J., J.A. Marchello, G.C. Duff, D.W. Schafer, H.A. Ahmad, E.V. Marchello. 2009. Comparison of feedlot performance, carcass characteristics and chemical composition of Waguli (Wagyu x Tuli) and Holstein steers. 2009 Arizona Beef Day Producers Update and Research Highlights: p55-56.

Schafer, D.W. and J.A. Marchello. 2009. Evaluation of composite and/or purebred cow productivity and profitability under stressful environmental conditions and subsequent progeny performance in the feedlot. 2009 Arizona Beef Day Producers Update and Research Highlights: p62.

Sprinkle, J.E., S.P. Cuneo, R.M. Enns and D.W. Schafer. 2009. Effects of a long-acting, trace mineral, reticulorumen bolus on range beef cow productivity and performance. 2009 Arizona Beef Day Producers Update and Research Highlights: p63.

Fish, R.D., D. Schafer and R.L. Ax. 2009. Use of progesterone to synchronize beef heifers and cows. 2009 Arizona Beef Day Producers Update and Research Highlights: p64.

Impacts and outcomes:

Provide producers with information on beef cattle performance from conception to consumption of selected purebreds and/or composites. Provide educational materials and conduct workshops for students, ranchers and the general public.

WERA-1 Expected outcomes and impacts:

1. Effective outreach and communication to beef producers through peer reviewed publications, bulletins, and direct interactions among beef producers, extension personnel, and scientists. This includes working closely with many breed associations and their members.
2. By developing the ability to conduct a phenomics focus, the group will share resources to efficiently maximize research efforts, training of students and extension personnel, as well as deliver improved tools to breeders. Most importantly, involvement in phenomics-based research fosters collaboration among scientists and increased productivity.
3. Focus on phenomics allows for information exchange and review of ongoing research to prevent duplication of efforts which maximizes use of limited research funds.
4. Involvement in phenomics research encourages cooperative research efforts that require scientists with varied expertise (i.e., quantitative and molecular genetics).
5. Collaborative/cooperative research efforts involving phenomics will lead to grant proposal development among committee members.
6. Information exchange will occur within the committee because of the knowledge of other members' academic and research activities. This knowledge will also facilitate cooperative efforts in research as well as student training and extension activities.
7. Attendance to the annual meeting will also yield detailed planning efforts for workshop/producer training efforts. This direct interaction allows the committee members to effectively discuss how to create programs to aid producer decision making relative to use genetic evaluations and (or) molecular markers for economically relevant and indicator traits.

OTHERS:

1. The Texas A&M project has received \$25,000 in internal funding and in \$30,000 external funding and provides results for cattle producers in the U.S. and areas of the world to identify genomics regions associated with cow productivity, longevity, temperament, and health measures, and, their potential interactions; we are collaborating with scientists across multiple disciplines and institutions.
2. Improvements and additions to the decision support model are ongoing based on feedback and input from users of the system. If all breeders of participating associations adopted this technology it would impact the performance of 750,000 commercial progeny from just these two breeds. If the system yields only an average of \$10 more profit per progeny produced, the economic result would be a \$7 million increase in profit.
3. Continued graduate student participation in the Breeding and Genetics Online Education Grant by students of members of the WERA-1. This grant is funded through the USDA Higher Education Challenge Grant series and continues through August of 2011. The program provides courses to supplement education of respective institutions by presenting additional information and breadth to programs than would otherwise be possible.
4. Current funding:

- Collaborator, European Union Commission, “Development, integration and dissemination of animal-based welfare indicators, including pain, in commercially important husbandry species, with special emphasis on small ruminants, equidae and turkey”.
- Investigator, Johne’s Disease Integrated Program, “Identification of Mutations in Genes Associated with Pathogenesis of *Mycobacterium avium* subspecies *paratuberculosis* Tissue Infection”.
- Investigator, NIFA International Program, “Relationships with New Zealand to Improve Feed Efficiency of Ruminants”
- Investigator, Western SARE, “Residual Feed Intake”