

# **CURRICULUM VITAE**

## **Glenn Calvin Duff**

### **Chronology of Education**

New Mexico State University, Department of Animal and Range Sciences,  
Las Cruces, NM

Doctor of Philosophy

January 1991

Major Area: Animal Nutrition, Related Area: Animal Physiology

Research Tool: Experimental Statistics

Dissertation Title: Effects of continuous versus daily rotational use of lasalocid and monensin on in vitro fermentation and blood clinical chemistry profiles in beef cattle fed a 90% concentrate diet.

Major Professor: Dr. Michael Galyean

University of Arkansas, Department of Animal and Poultry Science, Fayetteville, AR

Master of Science

August 1988

Major Area: Animal Physiology

Thesis title: Effect of energy intake on selected blood parameters in prepubertal Holstein heifers.

Major Professor: Dr. Jack Perkins

Northwest Missouri State University, Maryville, MO

Bachelor of Science

May 1986

Animal Science and Dairy Science

Iowa Western Community College, Council Bluffs, IA

Associates of Arts

May 1981

General Studies

### **Chronology of Employment**

Professor of Animal Science and Superintendent, New Mexico State University, Clayton Livestock Research Center, Clayton, NM. February 2017 to Present.

Department Head and Professor, New Mexico State University, Department of Animal and Range Sciences, Las Cruces. July 2015 to February 2017.

Department Head and Professor, Montana State University, Department of Animal and Range Sciences, Bozeman. December 2015 to July 2015.

Interim Dean and Director, College of Agriculture/Agricultural Experiment Station, Montana State University, Bozeman. September 2013 to December 2015.

Department Head and Professor, Montana State University, Department of Animal and Range Sciences, Bozeman. August 2010 to August 2013

Professor, Ruminant Nutritionist, The University of Arizona, Department of Animal Sciences, College of Agriculture and Life Sciences, Tucson. July 2009 to August 2010.

Associate Professor, Ruminant Nutritionist, The University of Arizona, Department of Animal Sciences, College of Agriculture and Life Sciences, Tucson. August 2001 to July 2009.

Assistant Professor of Animal Science and Superintendent, New Mexico State University, Clayton Livestock Research Center, Clayton, NM. September 1996 to August 2001.

Acting Superintendent and College Assistant Professor of Animal Science, New Mexico State University, Clayton Livestock Research Center, Clayton, NM. April 1996 to September 1996.

Postdoctoral Research Associate. New Mexico State University, Clayton Livestock Research Center, Clayton, NM. October 1994 to April 1996.

Sales Nutritionist. Farr Better Feeds, Garden City, KS. October 1993 to October 1994.

Research Specialist. University of Arkansas, Fayetteville, AR. August 1991 to October 1993.

Postdoctoral Research Associate. New Mexico State University, Clayton Livestock Research Center, Clayton, NM. January 1991 to August 1991.

Graduate Research and Teaching Assistant. New Mexico State University, Las Cruces, NM. August 1988 to December 1990.

Graduate Research Assistant. University of Arkansas, Fayetteville, AR. August 1986 to August 1988.

## **Service/Outreach**

### **Local/State**

As a member of the Southwest Nutrition and Management Conference Committee, actively involved in planning and conducting the annual conference every year since 2001. Attendance has increased every year to approximately 400 registrants.

Arizona Cattle Feeders' Association. – Affiliate Member

Presented "Feed Yard Research Issues" to the cattle feeders. The focus of the presentation was an overview of current and pending research projects to further improve health and performance of feedlot cattle. 2002

Education committee meeting at summer conference 2002.

Joint Arizona/California Cattle Feeders' meeting presented information on upcoming research for Holstein steers. 2006.

Arizona National Livestock Judging Contest  
Served as announcer for Collegiate Judging Contest.  
2001; 2002; 2003; 2004; 2005; 2008, 2009. 2010.

### **Community Service**

Clayton Rotary Club  
August 1996 to August 2001

The Rotary Club of Tucson Sunset (Paul Harris Fellow)  
December 2001 to August 2010.  
Active participant in Christmas Gift Basket Program to provide gifts and food for underprivileged families in Tucson.  
Chaired committee for Community Service – Program included Organ Donor Volunteers from the club. Ongoing project.  
Member Constitution and By-Laws Committee – Updated club constitution and by-laws.

Bulletin Editor 2002  
Board of Directors (Club Service) 2004 - 2005  
Sergeant at Arms 2005 - 2006  
President-Elect 2006 - 2007  
President 2007 – 2008

Bozeman Noon Rotary Club  
August 2010 to May 2011  
Resigned due to conflicts with courses taught

Las Cruces Rotary Club  
September 2015 to 2017

Clayton Rotary Club  
August 2017 to Present

Youth Supporters Clayton NM  
1996 to 1999  
Raised money for scholarships and responsible for hosting annual 4<sup>th</sup> of July Rodeo

### **National/International**

#### **American Society of Animal Science**

Editorial Board – 2000-2003  
Section Editor – Applied Animal Science 2002-2004  
Associate Editor – Ruminant Nutrition 2004-2005  
Animal Management Award Committee 2002-2003; 2005-2006, 2006-2007, 2009-2010  
American Feed Industry Association (AFIA) Ruminant Nutrition Award Committee 2004  
Ruminant Nutrition Committee 2016 to 2017  
Early Achievement Award Committee (Chair) 2017  
Membership Committee (Chair) 2016

**Western Section American Society of Animal Science**

Beef Symposium Committee 2005-2006; 2006-2007

Advising and Coordinating Committee

Member 2008-2010

Chair 2009-2010

Executive Committee 2009-2010

Secretary/Treasurer 2010-2011

President Elect 2011-2012

President 2012-2013

Past President 2013-2014

ASAS Board 2016 to 2019

CAST Board Representative for ASAS 2017 to 2019

**American Registry of Professional Animal Scientist (ARPAS)**

Editorial Board 2002 - Present

Program Committee 2006 – 2007

Sponsorship Committee 2013-2014

**External Peer Review for Promotion and Tenure**

New Mexico State University 2006

Texas A & M University 2008

New Mexico State University 2011

University of Arkansas 2012

Montana State University 2013

**United States Department of Agriculture (USDA)**

**USDA Cooperative State Research Education and Extension Service (CSREES)**

**Multicultural Alliance Unit 1890 Institution**

Peer Review Panel for the 1890 Institution Teaching and Research. Capacity Building Grants Program for Fiscal Year 2003. April 14 - 17, 2003, Washington, DC.

Ad hoc Peer Review for fiscal year 2004 and 2005. 1890 Institution Teaching and Research Capacity Building Grants Program.

**USDA Small Business Innovation Research Program (SBIR)**

Department of Agriculture Small Business Innovation Research Program. Ad hoc Reviewer for fiscal years 2006 and 2007

**Dairy Calf Heifer Raisers Association**

Program Committee for annual meeting Tucson, AZ March 2009

**Sultan Quaboos University, College of Agricultural and Marine Sciences, Sultanate of Oman, Muscat, Oman.**

External Examiner May 19 - 29, 2005 and May 17 - 27, 2006.

Evaluated the Department of Animal and Veterinary Sciences with the mission of assessing upper division undergraduate courses, meet undergraduate students and assess their performance and evaluate the Department of Animal and Veterinary Sciences M.S. program. For the 2006 trip, mission was to examine select 2000 and

3000 level courses and assess their standards and grading; meet students and assess their standards and performance in general; and advise the department on new degree plans.

#### **United Arab Emirates University**

External Referee Assignment. Reviewed research grant application titled "Development of sustainable salt tolerant forages for sheep & goat production" May 2002.

#### **Animal – An International Journal of Animal Bioscience**

Ad-hoc reviewer for journal

#### **Departmental Committees**

Whenever asked, participated on departmental committees at the University of Arizona.

Undergraduate/Scholarship Committee 2006 - 2010

Graduate Committee – 2001 - 2004

Chaired committee on a Master of Science – non-thesis degree

Beef Steering Committee 2001 - 2002

Chair 2002 - 2008

Southwest Nutrition and Management Committee

Co-Chair 2002 - 2010

Internal Peer Review for faculty APROL (Annual Performance Report)

Calendar years 2003, 2004, 2005, 2006

Search Committees

Chair - Farm Manager – Feedlot. 2004

Chair Search Committee Undergraduate Coordinator. 2005

Chair Search Committee – Animal Growth and Physiology Faculty position. 2006

Dairy Extension Faculty position 2002 and 2006

Chair Faculty Spousal Hire 2006

Undergraduate Coordinator 2007

Undergraduate Advisor, Instructor, Livestock Judging Coach 2009-2010

Chair Search Committee – Clayton Livestock Research Center Faculty 2018

Seminar Committee 2002 - 2005

Faculty Supervisor – University Feed Yard

Faculty Supervisor – Nutrition Laboratory

Department of Animal Sciences Promotion and Tenure Committee

2006 - 2007

Campus Agriculture Center Improvements 2006 - 2010

Faculty Supervisor Collegiate Cattle Growers' Association 2005 - 2010

Web Site Committee 2009-2010

#### **College of Agriculture and Life Sciences Committees**

University of Arizona

Farm Animal Care Committee 2001 -2010

College Curriculum Committee 2004 - 2010

Chair 2005 - 2010

College Teaching Accountability Committee

Chair 2007 - 2008  
Post-tenure Review Committee 2007 - 2009  
Vice-chair 2008  
Chair 2009

### **The University of Arizona Committees**

Undergraduate Council 2007 - 2010  
Chair Academic Programs Subcommittee 2007 - 2010  
Graduate Academic Programs Committee 2008 - 2010

### **Montana State University Accomplishments**

#### **DEAL Program**

Developing Excellence in Academic Leadership program for Montana State University. This program is designed for leaders and emerging leaders. The cohort is comprised of 25 campus leaders and each participant has budgetary and personnel management responsibilities in their program. Besides addressing the key challenges, my participation in the program has allowed the opportunity to meet key administrators at Montana State University.

#### **LEAD 21 Program**

Participated in the first and second session for LEAD 21. This program is designed for leaders and emerging leaders in the Land-Grant system. Besides addressing the key challenges, my participation in the program has allowed the opportunity to network with personnel from across the country. First session focused on self-evaluation and 360 feedback. Second session focused on change.

Participated in several university committees as interim dean including DEAL program steering committee. Served on a committee to deal with budget deficit in the Vice President for Research, on a university wide scholarship committee, and on various councils (President's Council, Dean's Council, etc).

### **Publications/Creative Activity (Published or Accepted)**

\* **Indicates work based primarily on studies completed as a graduate student.**

§ **Indicates corresponding authorship for G. C. Duff.**

**By convention, if G. C. Duff is not first author, authorship is listed according to contribution to the research project.**

#### *Book Chapters*

Galyean, M. L., and G. C. Duff. 1998. Feeding growing-finishing beef cattle. In: R. O. Kellems and D. C. Church (Eds.) *Livestock Feeds and Feeding* (4<sup>th</sup> Ed.). pp 262-280. Prentice-Hall, Englewood Cliffs, NJ. (Review)

Galyean, M. L., and G. C. Duff. 2002. Feeding growing-finishing beef cattle. In: R. O. Kellems and D. C. Church (Eds.) *Livestock Feeds and Feeding* (5<sup>th</sup> Ed.). pp 361-380. Prentice-Hall, Upper Saddle River, NJ. (Review)

Duff, G. C., and C. R. Krehbiel. 2008. Feeding growing-finishing beef cattle. In R. O. Kellems, Ed. *Livestock Feeds and Feeding* (6<sup>th</sup> Ed.). Prentice-Hall, Upper Saddle River, NJ. (Review)

Duff, G. C. 2007 through 2009. Beef Nutrition and Health: Dietary nutrient allowances for beef cattle. T. Lundeen, ed. Feedstuffs Volumes 79 to 81 (Review)

Duff, G. C. and J. D. Allen. 2010 through 2015. Beef Nutrition and Health: Dietary nutrient allowances for beef cattle. T. Lundeen, ed. Feedstuffs Volumes 82 to 87 (Review)

#### *Refereed Journal Articles*

1. \*Duff, G. C., A. L. Goetsch, K. M. Landis, A. C. Hardin, S. R. Stokes, and Z. B. Johnson. 1988. Mixing or alternating dietary nitrogen sources and performance of wether lambs. *Can. J. Anim. Sci.* 68:569-572.
2. \*Bachman, S. E., M. L. Galyean, D. M. Hallford, C. E. Heird, and G. C. Duff. 1991. A note on the influence of oestradiol-17 $\beta$  implants on serum hormone and metabolite concentrations in response to an epinephrine challenge in lambs. *Anim. Prod.* 55:295-298.
3. \*Kattnig, R. M., A. J. Pordomingo, A. G. Schneberger, G. C. Duff, and J. D. Wallace. 1992. Influence of saline water on intake, digesta kinetics, and serum profiles of steers. *J. Range Manage.* 45:514-518.
4. Galyean, M. L., K. J. Malcolm, and G. C. Duff. 1992. Performance of feedlot steers fed diets containing laidlomycin propionate or monensin plus tylosin, and effects of laidlomycin propionate concentration on intake patterns and ruminal fermentation in beef steers during adaptation to a high-concentrate diet. *J. Anim. Sci.* 70:2950-2958.
5. Kellogg, D. W., E. E. Hatfield, G. C. Duff, and Z. B. Johnson. 1993. Effect of replacing dried skim milk with peptone concentrate, whey, and dextrose in milk replacer on weight gain and feed efficiency of Holstein calves. *Prof. Anim. Sci.* 9:114.
6. \*Duff, G. C., M. L. Galyean, M. E. Branine, and D. M. Hallford. 1994. Effects of lasalocid and monensin plus tylosin on serum clinical chemistry profiles for beef steers fed a 90% concentrate diet. *J. Anim. Sci.* 72:1049-1058.
7. Malcolm-Callis, K. J., M. L. Galyean, and G. C. Duff. 1994. Effects of dietary supplemental protein sources and a *Pasteurella haemolytica* toxoid on performance and health of newly received calves. *Agri-Practice* 15:22-28.
8. \*Duff, G. C., M. L. Galyean, and M. E. Branine. 1995. Effects of adaptation to lasalocid and monensin on in vitro fermentation of prairie hay. *Can. J. Anim. Sci.* 75:417-423.
9. Duff, G. C., A. L. Goetsch, K. K. Park, D. L. Galloway, Sr., M. Rinne, and A. R. Patil. 1995. Feed intake and digestion by Holstein steers consuming low-protein forage supplemented with different nitrogen sources. *J. Appl. Anim. Res.* 7:115-128.

10. \*Duff, G. C., M. L. Galyean, and M. E. Branine. 1995. Effects of adaptation to lasalocid, monensin, or a daily rotation of lasalocid and monensin on in vitro fermentation of a 90% concentrate diet. *Can. J. Anim. Sci.* 75:129-134.
11. § Duff, G. C., M. L. Galyean, and K. J. Malcolm-Callis. 1996. Intake and ruminal fermentation by beef steers consuming prairie hay with supplements containing combinations of corn, soybean hulls, soybean meal, and urea. *J. Appl. Anim. Res.* 9:1-16.
12. Guthrie, M. J., M. L. Galyean, K. J. Malcolm-Callis, and G. C. Duff. 1996. Roughage source and level in beef cattle finishing diets. *Prof. Anim. Sci.* 12:192-198.
13. Brown, M. S., M. L. Galyean, G. C. Duff, D. M. Hallford, and S. A. Soto-Navarro. 1998. Effects of degree of processing and nitrogen source and level on starch availability and in vitro fermentation of corn and sorghum grain. *Prof. Anim. Sci.* 14:83-94.
14. Richards, J. B., D. M. Hallford, and § G. C. Duff. 1999. Serum luteinizing hormone, testosterone, and thyroxine and growth responses of ram lambs fed locoweed (*Oxytropis sericea*) and treated with vitamin E/selenium. *Theriogenology* 52:1055-1066.
15. Brown, M. S., D. M. Hallford, M. L. Galyean, C. R. Krehbiel, and G. Duff. 1999. Effect of ruminal glucose infusion on dry matter intake, urinary nitrogen composition, and serum metabolite and hormone profiles in ewes. *J. Anim. Sci.* 77:3068-3076.
16. Bryant, T. C., J. D. Rivera, M. L. Galyean, G. C. Duff, D. M. Hallford, and T. H. Montgomery. 1999. Effects of dietary level of ruminally protected choline on performance and carcass characteristics of finishing beef steers and on growth and serum metabolites in lambs. *J. Anim. Sci.* 77:2893-2903.
17. Galyean, M. L., L. J. Perino, and G. C. Duff. 1999. Interaction of cattle health/immunity and nutrition. *J. Anim. Sci.* 77:1120-1134.
18. Frank, G. H., and G. C. Duff. 2000. Effects of tilmicosin phosphate, administered prior to transport or at time of arrival, and feeding of chlortetracycline, after arrival in a feedlot, on *Mannheimia haemolytica* in nasal secretions of transported calves. *Am. J. Vet. Res.* 61:1479-1483.
19. Malcolm-Callis, K. J., § G. C. Duff, S. A. Gunter, E. B. Kegley, and D. A. Vermeire. 2000. Effects of zinc levels and source on performance, carcass characteristics, and serum parameters in finishing beef steers. *J. Anim. Sci.* 78: 2801-2808.
20. Brown, M. S., C. R. Krehbiel, G. C. Duff, M. L. Galyean, D. M. Hallford, D. A. Walker. 2000. Effect of degree of corn processing on urinary nitrogen composition, serum metabolite and insulin profiles, and performance by finishing steers. *J. Anim. Sci.* 78:2464-2474.
21. Soto-Navarro, S. A., C. R. Krehbiel, G. C. Duff, M. L. Galyean, M. S. Brown, and R. L. Steiner. 2000. Influence of feed intake fluctuation and frequency of feeding on nutrient



- digestion, digesta kinetics, and ruminal fermentation profiles in limit-fed steers. *J. Anim. Sci.* 78:2215-2222.
22. Soto-Navarro, S. A., § G. C. Duff, C. R. Krehbiel, M. L. Galyean, and K. J. Malcolm-Callis. 2000. Influence of feed intake fluctuation, feeding frequency, time of feeding, and rate of gain on performance by limit-fed steers. *Prof. Anim. Sci.* 16:13-20.
  23. § Duff, G. C., K. J. Malcolm-Callis, D. A. Walker, M. W. Wiseman, M. L. Galyean, and L. J. Perino. 2000. Effects of intranasal versus intramuscular modified live vaccines and vaccine timing on health and performance by newly received beef cattle. *Bovine Practitioner* 34(1):66-71.
  24. § Duff, G. C., K. J. Malcolm-Callis, D. A. Walker, M. W. Wiseman, and D. M. Hallford. 2000. Effects of pre-shipping versus arrival medication with tilmicosin phosphate and feeding chlortetracycline on health and performance of newly-received beef cattle. *J. Anim. Sci.* 78:267-274.
  25. Ralphs, M. H., J. D. Graham, G. Duff, B. L. Stegelmeier, and L. F. James. 2000. Impact of locoweed poisoning on grazing steer weight gain. *J. Range Manage.* 53:86-90.
  26. Gunter, S. A., K. J. Malcolm-Callis, G. C. Duff, and E. B. Kegley. 2001. Performance of growing steers supplemented with zinc pre- and post-shipping to the feedlot. *Prof. Anim. Sci.* 17:280-286.
  27. Mikus, J. H., § G. C. Duff, C. R. Krehbiel, D. M. Hallford, D. A. Walker, J. D. Graham, and M. H. Ralphs. 2001. Effects of an estradiol implant on locoweed consumption, toxicity, and recovery in growing beef steers. *Prof. Anim. Sci.* 17:109-114.
  28. Ralphs, M. H., F. D. Provenza, J. A. Pfister, D. Graham, G. C. Duff, and G. Greathouse. 2001. Conditioned food aversions: From theory to practice. *Rangelands* 23:14-18.
  29. Fent, G. M., R. W. Fulton, J. T. Saliki, S. L. Caseltine, H. D. Lehmkuhl, A. W. Confer, C. W. Purdy, R. E. Briggs, R. W. Loan, and G. C. Duff. 2002. Bovine adenovirus-7 infections in postweaning calves. *Am. J. Vet. Res.* 63:976-978.
  30. § Duff, G. C., M. H. Ralphs, D. A. Walker, J. D. Graham, J. D. Rivera, and L. F. James. 2002. Grazing behavior of Hereford, Charolais, or Brangus steers on locoweed-infested pastures. *Prof. Anim. Sci.* 18:33-37.
  31. Rivera, J. D., § G. C. Duff, M. L. Galyean, D. A. Walker, and G. A. Nunnery. 2002. Effects of supplemental vitamin E on performance, health, and humoral immune response of beef cattle. *J. Anim. Sci.* 80:933-941.
  32. Frank, G. H., R. E. Briggs, G. C. Duff, R. W. Loan, and C. W. Purdy. 2002. Effects of pretransit vaccination and arrival medication with florfenicol on the health of transported steers and the presence of *Mannheimia haemolytica* organisms in nasal secretions. *Am. J. Vet. Res.* 63:251-256.

33. Beck, P. A., S. A. Gunter, G. C. Duff, K. J. Malcolm-Callis, D. A. Walker, and E. B. Kegley. 2002. Performance of steers supplemented with copper pre- and(or) post-shipping to the feedlot. *Can. J. Anim. Sci.* 82:87-93.
34. Fulton, R. W., J. F. Ridpath, J.T. Saliki, R. E. Briggs, A. W. Confer, L. J. Burge, C. W. Purdy, R. W. Loan, G. C. Duff, and M. E. Payton. 2002. Bovine viral diarrhea virus (BVDV) 1b: Predominant BVDV subtype in calves with respiratory disease. *Can. J. Vet. Res.* 66:181-190.
35. Choat, W. T., C. R. Krehbiel, M. S. Brown, G. C. Duff, D. A. Walker, and D. R. Gill. 2002. Effects of restricted versus conventional dietary adaptation on feedlot performance, carcass characteristics, site and extent of digestion, digesta kinetics and ruminal metabolism. *J. Anim. Sci.* 80:2726-2739.
36. § Duff, G. C., M. L. Galyean, and K. J. Malcolm-Callis. 2002. Effects of proportions of steam-flaked corn and grain sorghum and switching grain sources during the finishing period on performance and carcass characteristics of beef steers. *Prof. Anim. Sci.* 18:387-394.
37. § Duff, G. C., B. D. Hunsaker, A. C. Anderson, J. D. Roder, and D. A. Walker. 2003. Florfenicol concentration in serum of beef cattle fed 0, 3, or 6% added dietary fat in a 70% concentrate diet. *J. Anim. Vet. Advan.* 2:44-48.
38. Frank G. H., R. E. Briggs, G. C. Duff, and H. S. Hurd. 2003. Effect of intranasal exposure to leukotoxin-deficient *Mannheimia haemolytica* at the time of arrival at the feedyard on the subsequent isolation of *Mannheimia haemolytica* from nasal secretions of calves. *Am. J. Vet. Res.* 64:580-585.
39. Rivera, J. D., § G. C. Duff, M. L. Galyean, D. M. Hallford, and T. T. Ross. 2003. Effects of graded levels of vitamin E on inflammatory response and evaluation of methods of supplementing vitamin E on performance and health of beef steers. *Prof. Anim. Sci.* 19:171-177.
40. § Duff, G. C., K. J. Malcolm-Callis, M. L. Galyean, and D. A. Walker. 2003. Effects of dietary urea concentration on performance and health of receiving cattle and performance and carcass characteristics of finishing cattle. *Can. J. Anim. Sci.* 83:569-575.
41. Fulton, R. W., R. E. Briggs, M. E. Payton, A. W. Confer, J. T. Saliki, J. F. Ridpath, L. J. Burge, and G. C. Duff. 2004. Maternally derived humoral immunity to bovine viral diarrhea virus (BVDV)1a, BVDV1b, BVDV2, bovine herpesvirus-1, parainfluenza-3 virus, bovine respiratory syncytial virus, *Mannheimia haemolytica* and *Pasteurella multocida* in beef calves, antibody decline by half-life studies and effect on response to vaccination. *Vaccine* 22:644-650.
42. Capitan, B. M., C. R. Krehbiel, R. E. Kirksey, L. M. Lauriault, G. C. Duff, and G. B. Donart. 2004. Effect of winter and summer forage type on pasture and feedlot performance and carcass characteristics by beef steer. *Prof. Anim. Sci.* 20:225-236.

43. Gleghorn, J. F., N. A. Elam, M. L. Galyean, G. C. Duff, N. A. Cole, and J. D. Rivera. 2004. Effects of crude protein concentration and degradability on performance, carcass characteristics, and serum urea nitrogen concentrations in finishing beef steers. *J. Anim. Sci.* 82: 2705-2717.
44. Bailey, C. R., § G. C. Duff, R. C. Cheatham, S. R. Sanders, T. W. Whitney, O. B. Mendivil, and J. L. Treichel. 2004. Dietary urea concentration and acid-base balance in feedlot steers fed a high concentrate steam-flaked corn-based diet. *Can. J. Anim. Sci.* 84:741-743.
45. Fulton, R. W., R. E. Briggs, J. F. Ridpath, J. T. Saliki, A. W. Confer, M. E. Payton, G. C. Duff, D. L. Step and D. L. Walker. 2005. Transmission of Bovine Viral Diarrhea Virus 1b to Susceptible and Vaccinated Calves by Exposure to Persistently Infected Calves. *Can. J. Vet. Res.* 69:161-169.
46. Whitney, T. W., § G. C. Duff, J. K. Collins, D. W. Schafer, and D. M. Hallford. 2006. Effects of diet for early-weaned crossbred beef steers on metabolic profiles and febrile response to an infectious bovine herpes virus-1 challenge. *Live. Sci* 101:1-9.
47. Whitney, Travis, § Glenn Duff, Peder Cuneo, David Henderson, David Schafer, Dennis Hallford, Robert Collier, and Paula Gentry. 2006. Effects of weaning programs on serum metabolites and hepatic IGF-1 mRNA of first calf heifers or mature cows. *J Food Agric. Envir.* 4(2):49-53.
48. Ibrahim, R. M., J. A. Marchello, and G. C. Duff. 2006. Effect of zeranol implantation on fatty acid composition of subcutaneous and intramuscular fat in beef steers. *Prof. Anim. Sci.* 22:301-306.
49. Cole, N. A., P. F. Defoor, M. L. Galyean, G. C. Duff, and J. Gleghorn. 2006. Effects of phase feeding of crude protein on performance, carcass characteristics, serum urea nitrogen concentrations and manure nitrogen of finishing beef steers. *J. Anim. Sci.* 84:3421-3432.
50. Thomas, C. T., A. E. Hoet, S. Sreevatsan, T. E. Wittum, R. Briggs, G. C. Duff, and L. J. Saif. 2006. Field transmission of bovine coronavirus and herd immunity against associated respiratory disease in feedlot cattle. *Am. J. Vet. Res.* 68:1412-1420.
51. Duff, G. C., and M. L. Galyean. 2007. BOARD SPONSORED REVIEW: Recent advances in management of highly stressed, newly received feedlot cattle. *J. Anim. Sci.* 85:823-840.
52. § Duff, G. C. 2007. Integrating lifetime nutrition from cow/calf to stocker to feedlot. L. Hollis and K. C. Olson, eds. Elsevier, Philadelphia, PA. *Vet. Clinics of North America: Food Animal Practice* 23:177-191.
53. § Duff, G. C., and C. P. McMurphy. 2007. Feeding Holstein steers from start to finish. L. Hollis and K. C. Olson, eds. Elsevier, Philadelphia, PA. *Vet. Clinics of North America: Food Animal Practice* 23:281-297.
54. Bailey, C. R., § G. C. Duff, S. R. Sanders, J. L. Treichel, L. H. Baumgard, J. A. Marchello, D. W. Schafer, and C. P. McMurphy. 2008. Effects of increasing crude protein

concentrations on performance and carcass characteristics of growing and finishing steers and heifers. *Anim. Feed Sci. Technol.* 142:111-120.

55. Ibrahim, R. M., J. A. Marchello, G. C. Duff, E. V. Marchello, and D. W. Schafer. 2008. Effect of two breeds and two dietary concentrate levels on feedlot performance, carcass composition and fatty acid profiles. *J. Anim. Sci.* 86:1426-1433.
56. Jones, B., R. D. Fish, A. Martin, G. C. Duff, and R. L. Ax. 2008. Effects of supplemental linoleic and linolenic acids on reproduction in Holstein cows. *Prof. Anim. Sci.* 24:500-505.
57. Cheatham, R. C., §G. C. Duff, C. R. Bailey, S. R. Sanders, R. J. Collier, J. A. Marchello, and L. H. Baumgard. 2008. Effects of implant programs on live performance, carcass characteristics, serum metabolites, fatty acid profiles and lipogenic gene expression of adipose tissue in Holstein steers. *S. African J. Anim. Sci.* 38:238-246.
58. Bailey, C. R., § G. C. Duff, S. R. Sanders, S. P. Cuneo, C. P. McMurphy, S. W. Limesand, J. A. Marchello, D. W. Schafer, M. L. Rhoads, and D. M. Hallford. 2008. Effects of ovariectomy and anabolic steroid implantation on the somatotrophic axis in feedlot heifers. *S. African J. Anim. Sci.* 38:207-216.
59. Zerai, D. B., K. M. Fitzsimmons, R. J. Collier, and G. C. Duff. 2008. Evaluation of Brewers Waste as partial replacement of fish meal protein in Nile-Tilapia (*Oreochromis niloticus*) diets. *J. World Aquaculture Soc.* 39:556-564.
60. Vogel, G. J., G. C. Duff, J. Lehmkuhler, J. L. Beckett, J. S. Drouillard, A. L. Schroeder, W. J. Platter, M. T. Van Koeveering, and S. B. Laudert. 2009. Effect of ractopamine hydrochloride on growth performance and carcass traits in calf-fed and yearling Holstein steers fed to slaughter. *Prof. Anim. Sci.* 25:26-32.
61. McMurphy, C. P., § G. C. Duff, M. A. Harris, S. R. Sanders, N. K. Chirase, C. R. Bailey, and R. M. Ibrahim. 2009. Effect of humic/fulvic acid in beef cattle finishing diets on animal performance, ruminal ammonia, and serum urea nitrogen concentration. *J. Appl. Anim. Res.* 35:97-100.
62. Beckett, J. L., R. Delmore, G. C. Duff, D. A. Yates, D. M. Allen, and N. Elam. 2009. Effects of zilpaterol hydrochloride on growth rates, feed conversion and carcass traits in calf-fed Holstein steer. *J. Anim. Sci.* 87:4092-4100.
63. O'Brien, M. D., R. P. Rhoads, S. R. Sanders, G. C. Duff, and L. H. Baumgard. 2010. Metabolic adaptations to heat stress in growing cattle. *Dom. Anim. Endocrin.* 38:86-94.
64. McDaniel, M. D., J. K. Collins, G. C. Duff, S. P. Cuneo, R. D. Glock, and J. W. Campbell. 2010. A survey of southern Arizona calves for persistent infection with bovine viral diarrhea virus. *The Bovine Practitioner* 44:88-92.
65. McMurphy, C. P., § G. C. Duff, S. R. Sanders, C. P. Cuneo, and N. K. Chirase. 2011. Effects of supplementing humates on rumen fermentation of Holstein steers. *S African J. Anim. Sci.* 41:134-140.

66. Penrod, L. V., S. E. Deaver, E. K. Prendergast, G. C. Duff, M. L. Rhoads, and M. J. Arns. 2011. Characterization of uterine pH during the estrous cycle of the mare. *J. Equine Vet Sci.* 31:310-311.
67. Bernal-Rigoli, J. C., § G. C. Duff, J. A. Marchello, S. P. Cuneo, S. R. Garcia, G. Xie, L. W. Hall, J. D. Allen, and C. D. Burrows. 2012. Effects of housing and feeding systems on performance of neo-natal Holstein bull calves. *J. Anim. Sci.* 90:2818–2825.
68. Allen, J. D., L. W. Hall, J. E. English, and § G. C. Duff. 2012. Effect of bird depredation on nutrient composition of cattle diets fed at two southwestern cattle facilities. *Prof. Anim. Sci.* 28:573-577.
69. Dick, K. J., § G. C. Duff, S. W. Limesand, S. P. Cuneo, D. K. Knudson, C. P. McMurphy, L. W. Hall, J. C. Bernal-Rigoli, and J. A. Marchello. 2013. Effects of *Lactobacillus acidophilus* and *Propionibacterium freudenreichii* on digestive tract morphology of neo-natal/transition Holstein bull calves and performance by calf-fed Holstein steers. *Prof. Anim. Sci.* 29:107-115.
70. Sharon, K. P., § G. C. Duff, J. A. Paterson, J. W. Dailey, J. A. Carroll, and E. A. Marceau. 2013. Case Study: Effects of timing of a modified-live respiratory viral vaccination on performance, feed intake, antibody titer response, and febrile response of beef heifers. *Prof. Anim. Sci.* 29:307-312.
71. Xie, G., § G. C. Duff, L. W. Hall, J. D. Allen, C. D. Burrows, J. C. Bernal-Rigoli, S. E. Dowd, V. Guerriero, C. J. Yeoman. 2013. Alteration of digestive tract microbiome in neo-natal Holstein bull calves by bacitracin methylene diasalicylate treatment and scours. *J. Anim. Sci.* 91:4984-4990.
72. Whitehurst, W.A., J. A. Paterson, M. M. Harbac, M. K. Petersen, G. C. Duff, T. W. Geary, G. I. Zanton, and T. J. Whistuba. 2014. Comparison of methionine hydroxyl analog chelated versus sulfate forms of copper, zinc and manganese on growth performance and pregnancy rates in yearling beef replacement heifers. *Prof. Anim. Sci.* 30:62-67.
73. Sharon, Kate, § Glenn Duff, Jeff Dailey, Jeff Carroll, Jonathan Hilmer, and Brian Bothner. 2014. Effects of supplemental lysine on performance, antibody titer, and rectal temperature in response to a modified-live viral vaccine in neonatal calves. *Am. J. Anim. Vet. Sci.* 9:122-127.
74. Ham, BR. C. Myrick , F. T. Barrows , C. J. Yeoman , G. C. Duff , M. G. Maskill, and W. M. Sealey. 2015. Feed characteristics alter growth efficiency of cutthroat trout. *J. Fish and Wildlife Manage.* 6:83-91.
75. Vogstad, A. R., B. Stokes, K. Perz, T. Wurtz, M. Hoyt, K. Spence, and § G. C. Duff. 2015. Effects of imposed intake variation at high and low levels of milk replacer on neonatal Holstein calf performance and health. *Prof. Anim. Sci.* 31:159-166.

76. Ham, B. R., F. T. Barrows, A. Huttinger, G. C. Duff, C. J. Yeoman, M. G. Maskill, and W. M. Sealey. 2015. The evaluation of dietary soy sensitivity in snake river cutthroat trout (*Oncorhynchus clarkia*). N. Am. J. Aquaculture 77:195-205.
77. Gedir J.V., J. W. Cain III, P. R. Krausman, J. D. Allen, G. C. Duff, and J. R. Margaret. 2016. Potential foraging decisions by a desert ungulate to balance water and nutrient intake in a water-stressed environment. PLoS ONE 11(2):e0148795.doi:10.1371/journal.pone.0148795
78. Cain, III, J. W., J. V. Gedir, J. P. Marshal, P. R. Krausman, J. D. Allen, G. C. Duff, B. D. Jansen and J. Morgart.. 2017. Extreme precipitation variability, forage quality and large herbivore diet selection in arid environments. Oikos 126:1459-1471.
79. Sealey. W. M., G. Gaylord, O. C. Betiku, C. J. Yeoman, G. C. Duff, S. S. Block, B. Bothner, and T. Hamerly. 2018. Differences in amino acid catabolism by gut microbes with/without prebiotics inclusion in GDDY-based diet affect feed utilization in Rainbow Trout. Aquaculture 490:108-119. doiI 10.1016/j.aquaculture.2017.09.006.
80. Betiku, O. C., C. J. Yeoman, T. G. Gaylord, B. Americus, S. Olivo, G. C. Duff, and W. M. Sealey. 2018. Water system is a controlling variable modulating bacterial diversity of gastrointestinal tract and performance in rainbow trout. PLoS ONE 13(4): e0195967. doi:10.1371/journal.pone.0195967.
81. Betiku, O. C., C. J. Yeoman, T. G. Gaylord, S. L. Ishaq, G. C. Duff, A. Mazurie, and W. M. Sealey. 2018. Divided nutritive function of the rainbow trout (*Oncorhynchus mykiss*) mid- and hind-gut microbiomes. Microbiome J. (Submitted).

### **Scholarly Presentations (2001 to present)**

§ Denotes presenter

#### **Seminars/Workshops**

§Duff, G. C. 2002 Role of Trace Minerals in Cow-Calf Health. Cow-Calf Health Programs for Arizona. Cliff Castle Casino, Camp Verde, AZ. Invited.

§Duff, G. C. 2004. Protein Requirements for Finishing Beef Cattle. Range Livestock Nutrition for the Southwest: What We've Learned and how to apply it. December 1, 2004 (Tucson, AZ), December 2, 2004 (Camp Verde, AZ), and December 3, 2004 (St. Johns, AZ). Invited

§Duff, G. C. 2004. Lamb Nutrition. Future of Lamb Production in Arizona. Presented material on lamb nutrition for seminar held at the University of Arizona Meats Lab on September 29 and 30, 2004. Invited

§Duff, G. C. 2004. Ruminant nutrition presentation for the University of Arizona Cooperative Extension Service Youth Quality Assurance Workshop. March 2004. Invited

§Duff, G. C. 2007. Heifer Development for San Carlos Apache Reservation. Invited.

§Duff, G. C. 2007. Ruminant Nutrition for the Grass fed Meat Production Workshop on Animal Health and Nutrition. Fall 2007. Invited

§Duff, G. C. 2008. Ruminant nutrition presentation for the University of Arizona Cooperative Extension Service Youth Quality Assurance Workshop. January 2008. Invited

#### Conferences and Symposia

§Duff, G. C., M. H. Ralphs, D. A. Walker, J. D. Graham, J. D. Rivera, and L. F. James. 2001. Influence of beef breeds (Brangus, Charolais, or Hereford) on locoweed consumption. Western Section American Society of Animal Sciences. Submitted presentation.

§Duff, G. C., B. D. Hunsaker, A. C. Anderson, J. D. Roder, and D. A. Walker. 2002. Florfenicol concentration in serum of beef cattle fed 0, 3, or 6% added dietary fat in a 70% concentrate diet. Midwestern Section American Society of Animal Science Submitted presentation.

§Duff, G. C., M. L. Galyean, and N. A. Cole. 2002. Dietary protein for beef cattle finishing diets. Southwest Nutrition and Management Conference. Invited.

§Duff, G. C., M. L. Galyean, C. R. Krehbiel, and N. A. Cole. 2002. Overview of recent protein research for beef cattle. Plains Nutritional Council Spring Conference. Invited

§Duff, G. C. 2004 University Update. Plains Nutrition Council Invited.

§Duff, G. C. 2004. Nutrition health interactions during the mid- and late-term feeding period. 2004 American Veterinary Academy Summer Conference. Ft. Collins, CO Invited.

Cheatham, R. C., and §G. C. Duff. 2004. Implant programs for long-fed Holstein steers. 19<sup>th</sup> Annual Southwest Nutrition and Management Conference. Invited

Bailey, C. R., and §G. C. Duff. 2005. Protein requirements for finishing beef cattle. 20<sup>th</sup> Annual Southwest Nutrition and Management Conference. Invited

§Allen, R. A., and §G. C. Duff. 2006. Update on Holstein blemish research at the University of Arizona. Arizona/California Cattle Feeders' Conference.

§Duff, G. C. and P. T. Andersen. 2007. Comparative Performance of Holstein vs. beef breeds in the feedlot. 22<sup>nd</sup> Annual Southwest Nutrition and Management Conference. Invited

§Duff, G. C. 2007. Impact of preweaning nutrition programs on calf growth and development. Western Section American Society of Animal Science Beef Symposium. "The Repercussions of lifetime nutrition programs." Invited

§Duff, G. C. 2007. Raising Holstein steers in the desert southwest: Implications of nutrition and environment. Arizona Dairy Production Conference. Invited

§Duff, G. C. 2014. Effects of nutrition on carcass characteristics of beef cattle. Besi Sigirciligi Sempozyumu. May 8 to May 11, 2014. Papillon Zeugma Otel, Antalya Turkey. Invited

§Duff, G. C. and C. J. Yeoman. 2015. Morphological, microbiological, and biochemical development of the ruminant gastrointestinal tract. July 2015. American Society of Animal Sciences Joint Animal Meeting. Orlando, FL. Invited

## **Grants and Contracts**

### **Federal**

Efficacy of experimental live oral vaccine against pneumonic pasteurellosis in shipped calves.

Percent effort: 10%.

Principle Investigators: Glenn C. Duff and Dr. Bob Briggs, National Animal Disease Center.

Funding: USDA-ARS, National Animal Disease Center, Ames, IA. Duration: October, 1998 to October 2003.

Amount Funded - **\$15,000**

**New Mexico State University, Clayton Livestock Research Center, Clayton, NM.**

Effects of dietary protein concentration and DIP/UIP ratio on cattle performance (body weight gain, feed intake, feed efficiency), manure composition, carcass characteristics, and plasma urea-N concentrations and effects of stage of feeding and diet on animal performance.

Percent effort: 10%.

Principle Investigator: Glenn C. Duff

Agency: USDA-ARS Bushland, TX; Section 224 Special Funds for the Consortium for Cattle Feeding and Environmental Sciences (CCFES). Duration: March 2001 to September 2003.

Amount Funded - **\$103,000**

**New Mexico State University, Clayton Livestock Research Center, Clayton, NM.**

Integrated research project Evaluation of low-input management strategies to improve health and well being of beef cattle

Percent Effort: 5%

Principle Investigator: Clint Loest (New Mexico State University)

Subcontract: G. C. Duff

Agency: USDA-NRI

Duration: September 2007 to September 2010

Amount funded \$397,505; **G. C. Duff portion: \$49,875**

**The University of Arizona, Department of Animal Sciences, Tucson, AZ**

Camplobacter Jejuni through the food chain: From range through processing

Percent effort: 5%



Principle Investigator: Lynn Joens (Veterinary Science and Microbiology, The University of Arizona)

Cooperator: G. C. Duff

Agency: USDA-Epi

Duration: September 2008 to September 2010

Amount Funded – \$939,415 total; **G. C. Duff portion \$99,718**

**The University of Arizona, Department of Animal Sciences, Tucson, AZ**

Cooperative Research Between Animal and Range Sciences and the US Fish & Wildlife Service Bozeman Fish Technology Center

Cooperator: Wendy Sealey

Amount Funded \$8,000; \$11,000, \$10,000 **Total \$29,000**

**Montana State University, Department of Animal and Range Sciences, Bozeman**

## **State**

Efficacy of modified-live vaccines containing bovine herpesvirus 1, bovine viral diarrhea, parainfluenza3 virus and bovine respiratory syncytial virus in preventing infection/disease. This experiment is conducted in conjunction with and addition to the aforementioned experiment.

Percent effort: 5%.

Principle Investigators: Glenn C. Duff, New Mexico State University, Dr. Robert Fulton, Oklahoma State University, and Dr. Bob Briggs, National Animal Disease Center.

Funding: Oklahoma State University, College of Veterinary Medicine.

Duration: October 2000 to October 2003.

Amount Funded - **\$10,000**

**New Mexico State University, Clayton Livestock Research Center, Clayton, NM.**

Administrative Extension for “Efficacy of Experimental Live Oral Vaccine Against Pneumonic Pasteurellosis in Shipped Calves.”

Percent effort: 5%.

Principle Investigators: Glenn C. Duff and Dr. Bob Briggs, National Animal Disease Center.

Funding: USDA-ARS, National Animal Disease Center, Ames, IA. Duration: October 2000 to October 2003.

Amount Funded - **\$10,000 (increased funding).**

**New Mexico State University, Clayton Livestock Research Center, Clayton, NM.**

Improving N movement through beef cattle feedlots. Funding Texas Agriculture Experiment Station.

Percent effort 10%.

Co-Principle Investigator: Glenn C. Duff, Principle Investigator – Dr. Wayne Greene,

Funding: Texas Agricultural Experiment Station.

Amount Funded - **\$51,705**

Duration: September 15, 2001 to September 14, 2004.

**The University of Arizona, Department of Animal Sciences, Tucson, AZ.**

Funding for feedmill elevator leg

The University of Arizona Agricultural Experiment Station

Amount Funded - **\$30,000**

**The University of Arizona, Department of Animal Sciences, Tucson, AZ.**

### **Industry**

Effects of Bio-Chlor on health and performance of newly received beef steers.

Percent effort: 5%.

Principle Investigator: Glenn C. Duff.

Funding: Agrimerica

Amount Funded - **\$7,500**

**New Mexico State University, Clayton Livestock Research Center, Clayton, NM.**

Effects of zinc sources on performance and carcass characteristics by finishing beef steers.

Percent effort: 5%.

Principle Investigator: Glenn C. Duff.

Partial financial support - QualiTech **\$3,748.00.**

**New Mexico State University, Clayton Livestock Research Center, Clayton, NM.**

The performance by and serum trace mineral concentration in calves supplemented with Alltech Stress pack before shipping to and after receiving at a New Mexico Feedlot.

Percent effort: 5%.

Investigators: Glenn C. Duff and Stacey Gunter (University of Arkansas).

Funding: Alltech, Inc.

Amount Funded - **\$4,080**

Duration: May, 1998 to May, 2003

**New Mexico State University, Clayton Livestock Research Center, Clayton, NM.**

Consumption and performance of Banamine-treated, long-haul, stressed cattle.

Percent effort: 5%.

Investigator: Glenn C. Duff.

Funding: Schering-Plough Animal Health

Duration: June, 1998 to June, 2003.

Amount Funded - **\$18,000**

**New Mexico State University, Clayton Livestock Research Center, Clayton, NM.**

Comparison of feed intakes following subcutaneous administration of UltraChoice or competitive products in confined fed beef cattle.

Percent effort: 5%

Investigator: Glenn C. Duff.

Agency: Pfizer Animal Health.

Duration: June, 1999 to June, 2004.

Amount Funded - **\$22,500**

**New Mexico State University, Clayton Livestock Research Center, Clayton, NM.**

Consumption of Lasalocid in free-choice (Roche Generic High Magnesium) mineral supplement by cattle grazing pasture and consumption of Lasalocid in free-choice (Purina Sugar-Mag) mineral supplement by cattle grazing pasture

Percent effort: 5%.

Principle Investigator: Glenn C. Duff.

Agency: Roche Vitamins, Inc.

Duration: January, 1998 to January, 2003.

Amount Funded - **\$12,000** (awarded as a gift).

**New Mexico State University, Clayton Livestock Research Center, Clayton, NM.**

Performance, carcass characteristics, and sensory evaluation of steaks from crossbred and purebred Longhorn steers.

Percent effort: 5%.

Principle Investigator: Glenn C. Duff.

Agency: Texas Cattlemen's Longhorn Registry.

Duration: March, 1999 to March, 2004.

Amount Funded - **\$12,345**

**New Mexico State University, Clayton Livestock Research Center, Clayton, NM.**

Effects of a slow-release urea (RumaPro) on performance and carcass characteristics of finishing beef steers.

Percent effort: 10%.

Principle Investigator: Glenn C. Duff.

Agency: NutriSource, Inc., Lamesa, TX.

Duration: Fall, 1999 to Fall, 2004.

Amount Funded - **\$22,500**

**New Mexico State University, Clayton Livestock Research Center, Clayton, NM.**

Evaluation of Optaflexx on growth performance and carcass characteristics in calf-fed Holsteins fed to harvest.

Percent effort: 5%

Principle Investigator: Glenn C. Duff.

Agency: Elanco Animal Health, Greenfield, IN

Duration: Spring 2004

Amount Funded - **\$66,855**

**The University of Arizona, Department of Animal Sciences, Tucson, AZ.**

Effects of humic/fulvic acid on ruminal fermentation profiles of dairy steers.

Percent effort. 5%

Principle Investigator: Glenn C. Duff

Agency: BioRemedies, San Ysidro, NM.

Duration: Spring, 2006

Amount Funded: **\$11,944**

**The University of Arizona, Department of Animal Sciences, Tucson, AZ.**

Effects of Bovamine on health, performance, and carcass characteristics of Holstein steers.

Percent effort: 5%

Principle Investigator: Glenn C. Duff

Agency: Nutritional Physiology Corporation, Guymon, OK.

Duration: Spring 2006 to Spring 2007

Amount Funded: **\$79,200**

**The University of Arizona, Department of Animal Sciences, Tucson, AZ.**

Effects of zilpaterol duration of dose on performance and carcass characteristics of calf-fed Holstein steers

Percent effort: 5%

Principle Investigator: Glenn C. Duff

Agency: Intervet, Hillsboro, DE

Duration Spring 2007-Spring 2010

Amount Funded: **\$70,000**

**The University of Arizona, Department of Animal Sciences, Tucson, AZ.**

Calf-fed Holstein calf blemish

Percent effort: 5%

Principle Investigator: Ron Allen, Bob Kattnig, Glenn Duff

Agency: National Cattlemen's Beef Association (NCBA)

Duration: Fall 2007

Amount Funded: **\$25,000**

**The University of Arizona, Department of Animal Sciences, Tucson, AZ.**

Effects of soluble BMD powder on health and performance of neo-natal Holstein steers and AS-700 on health and performance of steers post-weaning

Percent effort: 5%

Principle Investigator: Glenn C. Duff

Agency: Alpharma

Duration: Fall 2007 to Fall 2010

Amount Funded: **\$43,825**

**The University of Arizona, Department of Animal Sciences, Tucson, AZ.**

Effects of Gammulin on health and performance of neo-natal Holstein calves

Percent effort: 5%

Principle Investigator: Glenn C. Duff

Agency: American Protein Corporation

Duration: Fall 2007 to Fall 2010

Amount Funded: **\$23,191**

**The University of Arizona, Department of Animal Sciences, Tucson, AZ.**

Effects of Ractopamine on performance of rainbow trout

Cooperator: Wendy Sealey (Bozeman Fish Technology Center)

Agency: Elanco Animal Health

Amount Funded: **\$48,000**

Montana State University, Department of Animal and Range Sciences, Bozeman

Support for Celebrate Ag Weekend (several commodity groups; including Wheat and Barley Committee, Beef Council, MSU Alumni Foundation, etc.) = ~ \$20,000 (not included in total external funding).

Worked with Montana Legislature when serving as Interim Dean and Director of the College of Agriculture and Agricultural Experiment Station to secure \$2.5 million for the Long Range Building Plan. The funding was successful during the 2015 Montana legislative session (not included in Total External Funding)

<b>External Funding (New Mexico State University):</b>	<b>\$240,673</b>
<b>External Funding (The University of Arizona):</b>	<b>\$551,313</b>
<b>External Funding (Montana State University)</b>	<b><u>\$77,000</u></b>
<b>Total External Funding:</b>	<b>\$868,986</b>

## TEACHING AND ADVISING

### Extent of Teaching

#### Courses

##### University of Arizona

<u>Course</u>	<u>Title</u>	<u>Term</u>	<u>Enrollment</u>
AnS 234	Feeds and Feeding	Spring 2002	12
AnS 336	Applied Animal Nutrition	Spring 2002	18
AnS 596	Seminar	Spring 2002	13
AnS 336	Applied Animal Nutrition	Spring 2003	32
AnS 565	Advanced Nutrition Feedlot	Spring 2003	6
AnS 336	Applied Animal Nutrition	Spring 2004	33
AnS 596	Seminar	Spring 2004	15
AnS 336	Applied Animal Nutrition	Spring 2005	28
AnS 465	Advanced Nutrition Feedlot	Spring 2005	12
AnS 498A	Senior Capstone	Spring 2005	21
AnS 336	Applied Animal Nutrition	Spring 2006	30
AnS 336	Applied Animal Nutrition	Spring 2007	38
AnS 465	Advanced Nutrition Feedlot	Spring 2007	8
AnS 553	Statistics for Applied Exp.	Fall 2007	14
AnS 336	Applied Animal Nutrition	Spring 2008	47
AnS 336	Applied Animal Nutrition	Spring 2009	50
AnS 553	Statistics for Applied Exp.	Fall 2009	16
AnS 338	Principles of Companion Animal Nutrition	Summer 2010	8

##### Montana State University

ARNR 434	Beef Management	Fall 2010	42
ARNR 507	Research Methods	Spring 2011	8
ANSC 434	Beef Management	Fall 2011	40
ANSC 100	Introductory Anim Sci	Spring 2012	198
ANSC 434	Beef Management	Fall 2012	26
VM 580	Basic Nutrition	Spring 2015	11

**New Mexico State University**

ANSC 427	Dairy Production	Spring 2016	11
ANSC 247	Introduction to Meat Sci	Fall 2016	54
ANSC 429	Stocker/Feedlot Production	Fall 2017	23

**Co-taught Courses**

AnS 334 Principles of Nutrition Co-taught with Drs. Schurg and Baumgard. 40 to 50 students/year. Fall 2003, 2004, and 2005 University of Arizona

**Guest Lectures**

University of Arizona

AnS 102 Animal Industry. Two lectures and one laboratory/year covering animal nutrition. Fall 2002 – Present

AnS 477 Beef Resource Management. One to three lectures/year on feedlot nutrition and health. 2002-Present

V Sc 195F Careers in Veterinary Sci. One lecture/year covering beef cattle Fall 2002-2006

V Sc 543 Research Animal Methods One lecture on beef cattle research. 2005

V Sc 505 Diseases of Livestock. One to two lectures/year covering feedlot nutrition and health 2006, 2007, and 2008

AGSC 101 Intro to Ag and Environmental Resources. One lecture/year on Animal and Range Science Program 2011 and 2012.

ANSC 222 Livestock in Sustainable Systems. Lectures on Beef and Dairy Industry 2012.

**Courses Developed**

AnS 336 Principles of Animal Nutrition Co-developed with Drs. Schurg and Baumgard

An S 465/565 Advanced Nutrition/Feedlot

An S 553 Statistical for Applied Biological Experiments

AnS 338 Principles of Companion Animal Nutrition

VM 580 Basic Nutrition

ANSC 427 Dairy Production

ANSC 247 Introduction to Meat Science

**Faculty Advisor of Clubs**

University of Arizona

Collegiate Cattle Growers Association. This club is active in a variety of projects including getting cattle ready for show competition at the Arizona National Livestock Show. In addition, the students run a Jackpot Show (a competition for area 4-H and FFA members to show their livestock and get ready for county and/or state fairs). The club has held clinics to teach 4H and FFA members on proper techniques for selection of animals and proper methods to get the animal ready for livestock shows. Fund raising events include a booth at the University of Arizona Spring Fling. In addition, club members have started raising cattle and swine to support their activities. A discussion of future endeavors for the club with Drs. Marchello and Allen include the students marketing their products through the U of A Meats Laboratory.

Montana State University, Bozeman

AgStuCo. Agriculture Student Council Advisor 2010-1012 Co-Advisor 2014. This club is made up with representatives for all College of Agriculture clubs. The Agriculture

Student Council strives to promote agriculture within the College, the university, and the state. The Council fulfills this mission by promoting the programs, organizations, and objectives of the College of Agriculture. The Council provides a sounding board for students and allows input into the actions of the College administration. The goal is to

### **Undergraduate Advising**

Advised 7 undergraduate (4 Animal Science and 3 Range Science) students/year.

### **Undergraduate Honors Thesis**

Ms. Kristi Rhodes, Department of Veterinary Science and Microbiology, The University of Arizona.

### **Undergraduate Research Projects**

Advised a REU (Research Experience for Undergraduates) student (E. A. Marceau) at Montana State University. The NSF REU (Research Experience for Undergraduates) program in the Department of Chemistry and Biochemistry recruits ten students each year for summer research in chemical biology. REU students are primarily from small colleges in the upper northwest region of the United States, specifically including Native American students and students from the Tribal Community Colleges and other small colleges in Montana.

At Montana State University, worked with 3 students on a research project for an undergraduate research experience in the Department of Animal and Range Sciences. Students presented the research at the Montana Nutrition Conference (first place) and at the Western Section American Society of Animal Science meeting in 2015.

### **Thesis directed**

Jeff Mikus. New Mexico State University

Ms. Rita Camille Cheatham, The University of Arizona

Ms. Karianne Dick, The University of Arizona

Mr. Casey McMurphy, The University of Arizona

Research Chair for Mr. James English. (M.S. degree in Agriculture Education)

Mr. Laun Hall, The University of Arizona

Ms. Christina Bernal Rigoli The University of Arizona

Mr. Chirs Burrows, The University of Arizona

Mr. Guahao Xie, The University of Arizona

Ms. Kate Sharon, Montana State University

Ms. Kaitlyn Spence, Montana State University

Mr. Brian Ham, Montana State University

Mr. Josiah Brooks, New Mexico State University

### **Service on Thesis Committee**

Served on four M.S. committees as Assistant Professor for New Mexico State University.

Service at the University of Arizona includes:

Kendra Suhling, Major Professor – Dr. Mark Arns

Desale Zerai, Major Professor – Dr. Kevin Fitzsimmons and Dr. Robert Collier

Octavio Mendevil, Major Professor Dr. Lance Baumgard

Gina Mazella, Major Professor – Dr. Mark Arns

Alison Fitzgerald Major Professor Dr. Lance Baumgard and Dr. Robert Collier

Hank Haflinger III Major Professor Dr. Lance Baumgard

Matt McDaniel, (V Sc) Major Professor Dr. Bob Glock

Bonnie Jones, Major Professor Dr. Roy Ax.

Gilad Schwartz, Major Professor Dr. Lance Baumgard

Justice Mumba, Major Professor Dr. Robert Collier

Morgan OBrien Major Professor Dr. Lance Baumgard

### **Dissertations Directed**

Dr. Daniel Rivera,(Co-Chair) New Mexico State University, Dr. Rivera is Associate Professor Mississippi State University.

Dr. Travis Whitney. The University of Arizona, Travis is an Associate Professor for Texas A & M University in San Angelo, TX.

Dr. Clayton Bailey. The University of Arizona. Clay is a nutritionist for Tyson, Springdale, AR.

Dr. Jamie Allen, The University of Arizona. Dr. Allen is a Quality Assurance director for a private feed company in Utah

Dr. Bob Sager, DVM. Defended December 2014. Currently on staff for a livestock company in Russia

Dr. Omolola Betiku, started working on Ph.D. program in 2012. Completed Ph.D. 2017



## **Dissertation Committees**

Served as Co-Chair on one Ph.D. committee (Dr. Daniel Rivera) and as a member on two PhD. Committees (Dr. Sergio Soto-Navarro and Dr. Michael Brown) at New Mexico State University.

Dr. Chel Moore, Major Professor – Dr. Lance Baumgard U of A

Dr. Jane Kay, Major Professor – Dr. Lance Baumgard U of A

Dr. Rita Ibrahim, Major Professor Dr. John Marchello U of A

Dr. Rose Marie Burgos, Major Professor Dr. Robert Collier U of A

Zeno Brester, Major Professor Dr. Clint Loest. NMSU

Eben Oosythesen, Major Professor Dr. Clint Loest NMSU

## **Development and Scholarly Activity Supporting Teaching**

Western Teaching Symposium in Davis, CA. 2002

University of Arizona College of Agriculture and Life Sciences seminars

"Playing by the Rules" Promoting Honesty & Integrity: Discouraging Plagiarism.

Facilitated by Kathleen F. Gabriel 2004

“Teaching backwards” Facilitated by Dr. Jack Elliott. 2006

Western Teaching Symposium in Tucson, AZ. 2008

## **Evaluation of Teaching and Teaching Portfolio**

### **Student Evaluations of Teaching**

#### **Statistics of the Overall Teaching Effectiveness Question (out of 5.0)**

Course*	Title	Term	Section Mean	Comp Group <sup>++</sup>
AnS 234	Feeds and Feeding	Spr 2002	3.3	NA
AnS 336	Applied Animal Nutrition	Spr 2002	5.0	NA
AnS 596	Seminar	Spr 2002	NA	NA
AnS 336 Lec	Applied Animal Nutrition	Spr 2003	4.2	4.6
AnS 336 Lab			4.2	4.4
AnS 565	Advanced Nutrition Feedlot	Spr 2003	4.7	4.3
AnS 336 Lec	Applied Animal Nutrition	Spr 2004	4.7	4.4
AnS 596	Seminar	Spr 2004	NA	NA
AnS 336	Applied Animal Nutrition	Spr 2005	4.6	4.4
AnS 465	Advanced Nutrition Feedlot	Spr 2005	4.7	4.4
AnS 498A	Senior Capstone	Spr 2005	4.7	NA
AnS 336 Lec	Applied Animal Nutrition	Spr 2006	4.7	4.4

AnS 336 Lab			4.7	4.6
AnS 336 Lec	Applied Animal Nutrition	Spr 2007	4.6	4.4
AnS 336 Lab			4.3	4.6
AnS 465	Advanced Nutrition Feedlot	Spr 2007	4.6	4.4
AnS 553	Statistics for Applied Exp.	Fall 2007	4.2	4.3
AnS 336	Applied Animal Nutrition	Spr 2008	4.6	4.4

\*For AnS 336, lecture was separated from laboratory for 2003, 2006, and 2007; other years TCE reports were combined.

<sup>++</sup> The comparison group consists of courses taught during the past six years (Fall and Spring semester only) enrolling five or more student at the same subject area (determined by course subject prefix).