Brian A. Crooker
Professor

Appointment 60% Research, 25% Teaching, 15% Service

Research Area Nutritional Physiology of Ruminants

Appointment History

1996-present	Professor
1992-1996	Associate Professor
1987-1992	Assistant Professor

Graduate Program Affiliations
Animal Sciences – Senior Member

Professional and Honorary Societies
Member, American Society of Animal Science
Member, American Dairy Science Association
Member, Endocrine Society
Member, International Insulin-like Growth Factor Research Society
Member, American Association for the Advancement of Science
Member, Council for Agricultural Science and Technology (CAST)
Member, Gamma Sigma Delta
Member, Sigma Xi

Five Most Significant Publications

Baumgard, L.H., W.J. Weber, G.W. Kazmer, S.A. Zinn, L.B. Hansen, H. Chester-Jones, and B.A. Crooker. 2002. Effects of selection for milk yield on growth hormone response to growth hormone releasing factor in growing Holstein calves. *J. Dairy Sci.* 85:2529-2540.

Demonstrates lack of association between potential for milk yield and somatotropin response to GRF in the growing calf.

Crooker, B.A., W.J. Weber, L.S. Ma, and M.C. Lucy. 2001. Effect of energy balance and selection for milk yield on the somatotropic axis of the lactating Holstein cow: Endocrine profiles and hepatic gene expression. *In:* Energy Metabolism of Animals (15th Symposium). EAAP Energy Symposium, Snekkersten, Denmark. EAAP Publ. No. 103. pp. 345-348.

Demonstrates similar magnitude and duration of negative energy balance in low and high merit cows during the transition period. Demonstrates prolonged or extended postpartum reduction in circulating IGF-1 in the high merit cows. (Manuscript will be submitted to J. Dairy Sci. before October).

Lucy, M.C. and B.A. Crooker. 2001. Physiological and genetic differences between low and high index dairy cows. *In:* Fertility in the High Producing Dairy Cow. British Society of Animal Science Occas. Publ. No. 26. Vol. 1. Galway, Ireland. pp. 223-236.

Demonstrates potential role of reduced LH and FSH postpartum in the delayed onset of luteal phases. This coupled with reduced progesterone during the luteal phase may partially explain the increase in days open for cows selected for increased milk yield. (Manuscript will be submitted to J. Dairy Sci. before October).

Lee, B.K., G.F. Lin, B.A. Crooker, M.P. Murtaugh, L.B. Hansen, and H. Chester-Jones. 1996. Association of a somatotropin (bST) gene polymorphism at the 5th exon with selection for milk yield in Holstein cows. *Domestic Animal Endo.* 13:373-381.

Demonstrates lack of association between potential for milk yield and polymorphism in the 5th exon of the somatotropin gene.

Hongerholt, D.D., B.A. Crooker, J.E. Wheaton, K.M. Carlson, and D.M. Jorgenson. 1992. Effects of a growth hormone-releasing factor analogue and an estradiol-trenbolone acetate implant on somatotropin, insulin-like growth factor I, and metabolite profiles in growing Hereford steers. *J. Anim. Sci.* 70:1439-1448.

Demonstrates interaction, additive effects of increased circulating concentrations of somatotropin (increased via GRF) and steroids (estradiol and trenbolone acetate implant) on circulating IGF-1 concentrations.

Refereed Journal Publications and Book Chapters (Last Five Years)

Authored or co-authored 8 papers in peer-reviewed journals.

Block, S.S., R.P. Rhoads, D.E. Bauman, R.A. Ehrhardt, M.A. McGuire, **B.A. Crooker**, J.M. Griinari, T.R. Mackle, W.J. Weber, M.E. Van Amburgh, and Y.R. Boisclair. 2003. Demonstration of a role for insulin in the regulation of leptin in lactating dairy cows. *J. Dairy Sci.* 2003 86: 3508-3515.

Radcliff, R.P., B.L. McCormack, **B.A. Crooker**, and M.C. Lucy. 2003. Growth hormone (GH) binding and expression of GH receptor 1A mRNA in hepatic tissue of periparturient dairy cows. *J. Dairy Sci*. 2003 86: 3933-3940.

Radcliff, R.P., B.L. McCormack, **B.A. Crooker**, and M.C. Lucy. 2003. Plasma hormones and expression of growth hormone receptor and insulin-like growth factor-I mRNA in hepatic tissue of periparturient dairy cows. *J. Dairy Sci.* 2003 86: 3920-3926.

Baumgard, L.H., W.J. Weber, G.W. Kazmer, S.A. Zinn, L.B. Hansen, H. Chester-Jones, and **B.A. Crooker**. 2002. Effects of selection for milk yield on growth hormone response to growth hormone releasing factor in growing Holstein calves. *J. Dairy Sci.* 85:2529-2540.

Rausch, M.I., M.W. Tripp, K.E. Govoni, W. Zang, W. Weber, **B.A. Crooker**, T.A. Hoagland, and S.A. Zinn. 2002. The influence of level of feeding and on growth and serum insulin-like growth factor I and insulin-like growth factor-binding proteins in growing beef cattle supplemented with somatotropin. *J. Anim. Sci.* 80:94-100.

Bilby, C.R., Bader, J.F., Salfen, B.E., Youngquist, R.S., Murphy, C.N., Garverick, H.A., **Crooker, B.A.**, and M.C. Lucy. 1999. Plasma GH, insulin-like growth factor-I and conception rate in cattle treated with low doses of recombinant bovine GH. *Theriogenology* 51:1285-1296.

Kusina, J., J.E. Pettigrew, A.F. Sower, M.R. Hathaway, M.E. White, and **B.A. Crooker**. 1999. Effect of protein intake during gestation on mammary development of primiparous sows. *J. Anim. Sci.* 77:925-930.

Kusina, J., J.E. Pettigrew, A.F. Sower, M.E. White, **B.A. Crooker**, and M.R. Hathaway. 1999. Effect of protein intake during gestation and lactation on the lactational performance of primiparous sows. *J. Anim. Sci.* 77:931-941.

Proceedings and Invited Lectures (14) (Last Five Years)

Crooker, Brian A., David T. Galligan, Wanda J. Weber, Robert J. Collier, Mireille Chahine, Tim H. Klusmeyer, Michael F. McGrath, and John L. Vicini. 2004. Induced Lactation - If Approved, Would It Be Economical? Southwest Nutrition and Management Conference Proceedings. University of Arizona. pp. 152–161.

McGuire, M. A., Mitchell Theurer, John L. Vicini, and **Brian A. Crooker**. 2004. C ontrolling Energy Balance in Early Lactation. Western Canadian Dairy Symposium. Advances in Dairy Technology. 16:241-252.

Crooker, B.A. 2003. Effect of selection for milk yield on growth and lactational performance: energy balance and endocrine profiles in the Holstein cow. Monsanto Science Symposium. St. Louis, MO. August 2, 2003. CD distributed to dairy producers and the scientific community.

Crooker, B.A., M. Chahine, W.J. Weber, J.K. Reneau, J.L. Vicini, M.F. McGrath, E.A. Reed, and T.H. Klusmeyer. 2003. Induction of lactation using steroid hormones and bST in nonpregnant, reproductive cull Holstein cows. *In:* Proc. MN Dairy Days-2003. pp. 54-55.

Crooker, B.A., M. Chahine, W.J. Weber, J.K. Reneau, J.L. Vicini, M.F. McGrath, E.A. Reed, and T.H. Klusmeyer. 2003. Induced lactation: The need for enhanced mammary development and differentiation. Lactation Biology Symposium – Altering the Lactation Cycle in Dairy Cows. Annual National Meeting of ADSA/ASAS. Phoenix, AZ. June 25, 2003.

Crooker, B.A. 2003. Induced lactation – technical update. Monsanto Science Program – Development Meeting. St. Louis, MO. April 15, 2003.

Vicini, J.L., **B.A. Crooker**, and M.A. McGuire. 2002. Energy balance in early lactation dairy cows. In: California Animal Nutrition Conference. pp. 1-8. Fresno, CA.

Crooker, B.A., W.J. Weber, L.S. Ma, and M.C. Lucy. 2001. Effect of energy balance and selection for milk yield on the somatotropic axis of the lactating Holstein cow: Endocrine profiles and hepatic gene expression. *In:* Energy Metabolism of Animals (15th Symposium). EAAP Energy Symposium, Snekkersten, Denmark. EAAP Publ. No. 103. pp. 345-348.

Lucy, M.C. and **B.A. Crooker**. 2001. Physiological and genetic differences between low and high index dairy cows. *In:* Fertility in the High Producing Dairy Cow. British Society of Animal Science Occas. Publ. No. 26. Vol. 1. Galway, Ireland. pp. 223-236.

Da, Y., T.S. Sonstegard, **B.A. Crooker**, F.A. Ponce de León, L.B. Hansen, H. Chester-Jones, M.L. Fahning, B.E. Seguin, and G.D. Marx. 2000. Designs of resource populations for dairy QTL mapping. W.E. Petersen Lecture. Dairy Genomics: Trends and Opportunities, University of Minnesota, St. Paul, December 11-12.

Crooker, B.A. 1999. Effect of selection for milk yield from a nutritional physiologist's viewpoint. Lactation Biology Symposium – Selection for Milk Yield. American Dairy Science Association Annual Meeting. Memphis, TN. June 22, 1999.

Crooker, B.A. 1999. Effect of selection for milk yield on nutritional physiology of the cow. Monsanto Dairy Industry. June 3, 1999.

Crooker, B.A. 1999. Impact of the use of hormones on milk production. The Dairy Industry and the "U". Handout for three M.A.E.S. Workshops (Crookston, January 9; Zumbrota, January 23; Melrose, February 6).

Crooker, B.A. 1999. Improved understanding of animal biology can increase productive efficiency, benefit the environment, and produce safe, nutritious food. The Dairy Industry and the "U". Poster for three M.A.E.S. Workshops (Crookston, January 9; Zumbrota, January 23; Melrose, February 6).

Funding (Last Five Years) **– $635,394**

Monsanto. Nutritional physiology research. Ongoing gifts. $433,944**.**

USDA. Development of an F-2 population for dairy QTL mapping. Y. Da (PI). 1999-03. $50,000.

Monsanto. Clinical evaluation of feeding dairy replacement heifers. 1998-01. $201,450.

Undergraduate Research Training

Amanda Gardiner. Ongoing. Mammary development in cows induced to lactate.

Amanda Gardiner. 2003. Milk progesterone concentrations in cows induced to lactate.

Amy Steinhorst. 2002. An evaluation of the ability of the ovsynch protocol to synchronize reproductive cull dairy cows.

Tracy Julius. 2002. Analytical techniques in nutritional physiology - Isolation of RNA from hepatic biopsies for use in ribonuclease protection assays for hepatic growth hormone receptor and insulin-like growth factor-I mRNA.

Alison Bertling. 2001. Analytical techniques in nutritional physiology - Isolation of RNA from hepatic biopsies for use in ribonuclease protection assays for hepatic growth hormone receptor and insulin-like growth factor-I mRNA.

Brian Massmann. 2001. Factors affecting the successful induction of lactation in dairy cattle.

Erin Peterson. 2001. Effect of ensiling alfalfa on dietary protein availability in the ruminant intestine.

Amy Steinhorst. 2001. Serum progesterone concentrations in cows induced to lactate.

Beth Walsh. 2001. Analytical techniques in nutritional physiology-Metabolite (spectrophotometric) and endocrine (radioimmunoassays) assays.

Graduate Student and Post-doctoral Supervision - Current Advisees

Mariana Carriquiry	Ph.D.	Animal Sciences
Mireille Chahine	Ph.D.	Animal Sciences
Si-Hung Wu	Ph.D.	Animal Sciences

Courses Taught (Last Five Years)

Designator	Name	Credits	% Effort	Term	Years
CVM 6815	Ruminant Nutrition	3	2%	Summer	2000-2002
AnSc 4403	Ruminant Nutrition	3	30,30,60,70%	Spring	2000-2003
AnSc 3411	Growth & Development	3	7%	Spring	2000-2003
AnSc 2401	Animal Nutrition	3	10,25,10%	Fall	2000-2002
AnSc 8311	Animal Bioenergetics	3	33%	Fall	2001
AnSc 8311	Animal Bioenergetics	3	100%	Spring	2004
AnSc 8312	Protein Metabolism	4	30%	Fall	2002

Service

Board of Directors, Minnesota Foundation for Responsible Animal Care

Member, Minnesota Beef Council Issues Management Advisory Board

Reviewer: *J. Dairy Research, J. Anim. Sci, J. Dairy Sci, Can. J. Zoology, Livestock Production Science, The American Physiological Society, Animal Feed Science Technology, J. Endocrinology*

FASS Physiology and Endocrinology Program Committee 2003 – 2005, Chair 2005

Academic Quadrathalon - Quiz Bowl.

Reviewer: USDA NRICGP, BARD

External Reviewer, Pennsylvania State University

Member, AFIA Ruminant Nutrition Award Committee

Service to National and Regional Research Committees

Representative, Regional Project NE-148, Regulation of Nutrient Use in Food Producing Animals.

Member, NC-1010, Interpreting Cattle Genomic Data: Biology, Applications and Outreach (formerly NC-209).

Member, NC-1009, Metabolic Relationships in Supply of Nutrients for Lactating Cows (formerly NC-185).

Member, W-181, Modifying Milk Fat Composition for Improved Nutritional and Market Value. (to become MN representative 2005).