

James G. Linn

Professor

Appointment 15% Research, 10% Teaching, 75% Extension

Research Area Dairy Cattle Nutrition

Appointment History

1987-present	Professor
1983-1987	Associate Professor
1979-1983	Assistant Professor

Graduate Program Affiliations

Animal Sciences – Animal Sciences

Professional and Honorary Societies

Member, American Dairy Science Association
Board Member, American Dairy Science Association
Member, American Society of Animal Science
Member, Minnesota Milk Producers Association

Five Most Significant Publications

Making High Corn Silage Diets Work. 2003 Minnesota Dairy Conf. and Dairy Expo, St. Cloud (pp. 58-63,) and Northeast Feed Dealer meetings in NY and NH – 2004.

This extension publication summarizes corn silage research reported in the Journal of Dairy Science over the last 5 years. It provides guidelines and information for formulation and feeding of diets containing more than 35% of the total DM as corn silage.

Pricing Corn Silage. Dairy Today. March 2002.

How to price forages whether home raised or purchased continues to be a question for dairy producers and forage growers. This article provided a formula and guideline from which corn silage can be priced based on nutrient content and quality. Requests for copies and discussion on the article continue.

Nutrient Requirements of Dairy Cattle. 2001.

Comprehensive overview of dairy nutrition research conducted the last 11 yrs. Updated the nutrient requirements for all classes of dairy animals and provides the guidelines and information base for the feeding and formulation of diets for dairy animals.

Dairy Health and Nutrition: Nutrient Requirements of Dairy Cattle. Feedstuffs Reference Issue – Published annually.

This publication summarizes the 2001 Dairy NRC into a practical and applied document. It is a quick nutrient requirement reference for dairy nutritionists. It is distributed and used by dairy nutritionists worldwide.

Refereed Journal Publications and Book Chapters (Last Five Years)

Authored or co-authored 2 papers in peer-reviewed journals and 1 book chapter.

- Nennich, T.D., **J.G. Linn**, D.G. Johnson, M.I. Endres, and H.G. Jung. 2003. Comparison of feeding corn silages from leafy or conventional corn hybrids to lactating dairy cows. *J. Dairy Sci.* 2003 86: 2932-2939.
- Jung, H.G., M.A. Jorgensen, **J.G. Linn**, and F.M. Engels. 2000. Impact of accessibility and chemical composition on cell-wall polysaccharide degradability of maize and Lucerne stems. *J. Sci. Food and Ag.* 80: 419-427.

Book:

- Nutrient Requirements of Dairy Cattle – 7th Edition. National Academy Press. Washington, DC. 2001. One of 11 authors. Released in January 2002.

Awards

- Outstanding Graduate Faculty Member, Department of Animal Science, 2001.

Proceedings and Invited Lectures (10)

- Linn, J.** and M. Raeth-Knight. 2002. Forage quality for dairy cows. *In: Proc. ANEMBE (Spanish Veterinary Medical Association), Madrid, Spain.*
- Linn, J.** and M. Raeth-Knight. 2002. Water quality and quantity for dairy cattle. *In: Proc. ANEMBE (Spanish veterinary Medical Association), Madrid, Spain.*
- Linn, J.G.** 2001. The 7th edition of the nutrient requirements of dairy cattle: Synopsis and practical application for lactating cows. *In: Proc. 16th Southwest Nutrition and Management Conf. Univ. of Arizona, Phoenix. Feb. 22 and 23. pp. 101-115.*
- Linn, J.** 2001. Overview and guide to the 7th edition of the nutrient requirements of dairy cattle. *In: Proc. 10th NE Dairy Production Medicine Symp. NE Dairy Veterinary Medical Assn., Syracuse, NY. March 16-18. pp. 1-18.*
- Linn, J.G.** 2001. Overview of the 7th edition of the nutrient requirements of dairy cattle. *In: Proc. Colorado Dairy Nutrition Conf. Jan. 23, 2001. Greeley, CO. Colorado State Univ. Coop. Extension Service.*
- Linn, J., K. Janni, and J. Reneau.** 2001. Management decisions for the expanding dairy. *In: Proc. of Swedish Dairy Nutrition and Management Conf. Swedish Dairy Assn., Linköping, Sweden. pp. 109-118.*
- Linn, J.** and M. Raeth-Knight. 2001. Practical application of body condition scoring in the USA. *In: Proc. Swedish Dairy Nutrition and Management Conf. Swedish Dairy Assn., Linköping, Sweden. pp. 163-168.*
- Release of Nutrient Requirements of Dairy Cattle – 7th Edition. Jan. 16-18, 2001. Des Moines, IA. Presentations on DM Intake and Water Quality chapters via satellite to 18 U.S. locations and 7 international locations.
- Linn, J.** and L. Torbert. 2000. Heifer feeding guidelines: An update on changes in nutrient requirements of growing heifers. *In: Proc. 4th Annual Prof. Dairy Heifer Growers Conf. St. Louis, MO.*
- Linn, J.G.** 2000. Milk components: How do we get them and what do they tell us? *In: Proc. Colorado Dairy Nutrition Conf.*

Funding (Last Five Years) – \$206,257

- Ridley Feed Operations.** Nutritional health management of dairy calves. H. Chester-Jones (PI). 2003-09. \$370,000.
- USDA AG RES SVC.** Impact of alfalfa hay NDF content and digestibility on dairy cow performance. 2003-05. \$117,257.
- University of Nebraska.** Systems evaluations reduce input dairy farms. D. Johnson (PI). 2003-05. \$10,000.

Nutritional Physiology Corporation. 2003. \$28,000.

Dow. Gift. 2002. \$10,000.

Glacial Grains and Spirits (AURI). 2001. \$25,000.

Mycogen Seeds. Gift. 2000. \$26,000.

Dissertations and Theses (Last Five Years)

Name	Program	Degree	Thesis Title
Dana M. Allen	Animal Sciences	Ph.D.	Dry matter intake and neutral detergent fiber intake of dairy cattle.
Carla R. Kuehn	Animal Sciences	Ph.D.	Sources of variation in corn silage quality and feeding value for lactating dairy cows.
Tamilee D. Nennich	Animal Sciences	M.S.	Effect of corn silage hybrid on intake, digestion, and milk production by dairy cows.
Laura A. Torbert	Animal Sciences	M.S.	Effects of raising regime and protein supplementation during lactation on milk yield of primiparous Holstein cows.
Barry M. Visser	Animal Sciences	M.S.	Effects of diets and drenching on transition dairy cows.

Undergraduate Theses (Last Five Years)

Name	Thesis Title
Ross Templeton	Growth of Holstein and Holstein x Jersey calves.
Erin Hammel	Accelerated milk replacer program for Holstein and Holstein x Jersey calves.
Krista Steffenhagen	Manganese levels in water fed to calves.

Graduate Student and Post-doctoral Supervision - Current Advisees

Ebener Ballinger	M.S.	Animal Sciences
Mary L. Raeth-Knight	M.S.	Animal Sciences
Jessica P. Wakker	M.S.	Animal Sciences

Courses Taught (Last Five Years)

Designator	Name	Cr	% Effort	Term	Years
AnSc 4403	Ruminant Nutrition	3	20%, 35%	Spring	2000, 2001
AnSc 4604	Dairy Prod Systems Mgmt	4	15%	Spring	2000
AnSc 4403X	Forages in Ruminant Nutr	3	30%	Fall	2000
AnSc 4403	Ruminant Nutrition	4	35%	Spring	2002
AnSc 4403	Ruminant Nutrition	3	50%	Spring	2004

Service

Member, Mineral and Toxic Substances in Feed and Water for Animals – National Academy of Science Committee, 2004-2006.

ADSA Board of Directors, 2003-2006.

Program Chair, Joint ADSA/ASAS and Canadian Society of Animal Science meetings, July, 2002 in Quebec City, Canada

Minnesota Nutrition Conference Committee - continuous

Reviewer, *Journal of Dairy Science*, 22 articles, 1999-2003.

Program Committee–FASS (ADSA/ASAS/PSA/RMC) annual meeting in Indianapolis, July 2001; + Program Chair from ADSA on the committee

Member, Nutrient Requirements of Dairy Cattle Committee, National Research Council, 2001

Extension Activities (Last Five Years)

Program Team Involvement and Goals

The major programs include:

Dairy Modernization Program, Team Member

Audience: Minnesota dairy stakeholders, producers and consumers

Goal: Plan and implement educational curriculum for improved (modernized) dairy management techniques and operations.

Dairy Advisory Group, Member

Group members: Core Dairy Extension Team, COAFES and CVM dairy faculty, MN Dairy Initiative Program, MN Dairy Leaders Roundtable, MDA, MMPA, Ridgewater Community College, and other dairy industry professionals

Audience: Minnesota dairy stakeholders, producers and consumers

Goal: Provide input on the development of educational activities relevant to dairy producers and the dairy industry.

Minnesota Dairy Days, Member, Program planning group

Audience: Producers, dairy farm advisors, industry professionals, students

Goal: Provide current information on important topics, present practical ideas on how producers can make stepwise changes in their operations to achieve success.

Dairy Diagnostics

Audience: Producers and their farm service providers

Goal: Diagnose production problems and help improve profitability. Emphasis is on forage quality, dairy cattle nutrition, feeding management, and nutritional strategies.

Dairy Nutrition

Audience: Producers, managers, feed technicians, nutritionists, and other industry personnel

Goal: Enhance the viability and profitability of dairying in MN by providing information on the principles of dairy nutrition, ration formulation, vitamins and minerals in dairy rations, feeding recommendations for calves, heifers, transition cows, and dry cows, TMR mixers, forage quality, water quality, the harvesting, management and feeding of corn silage.

Job Partners Program

A collaborative project between U of MN Extension dairy educators and Ridgewater College.

Audience: Dairy farm employees and managers

Goal: Develop educational and interactive training workshops for current and future dairy farm employees and managers.

Calf and Heifer Management – Birth to 120 Days of Age – Workshop, Contributor

Audience: Expert and novice calf and heifers producers

Goal: Provide education on applied management techniques for rearing dairy calves and replacement heifers.

International Extension/Outreach

Audience: International visitors

Goal: Host international visitors, escort on tours of U of MN facilities, dairy farms, dairy conferences, and give presentations on dairy cattle feeding in the Midwest and other topics related to dairy nutrition and management.

Product Development (selected materials developed)

- Minnesota Dairy Days CD: proceedings articles, updates on U of MN dairy research, additional topic-related material, and links to dairy related sites.
- Job Partners teaching materials (3-ring notebook, 50-100 pgs/project). Feeders School; Transition Cow Workshop; Management of Dairy Calves: Birth- 60 Days.
- Calf Management Manual (150 pgs), a Midwest Plan Service publication, and companion CD. Coordinated by Dr. Pat Hoffman, U of WI with U of MN faculty authoring or co-authoring various sections.
- Proceedings: Four-State Applied Nutrition and Management Conference; Four-State Dairy Management Seminar; Four-State Forage Conference.
- Manure Scoring and Evaluation Scoring Guide.
- Hubbard Tech (Mankato, MN) news articles (2- to 4-page technical updates).
- Dietary nutrient recommendations for dairy cattle. *In: Feedstuffs 2001 Ref. Guide.*
- Harvesting, storing and feeding corn silage (J. Linn and D. Allen). Handout.

Program Delivery Events

Programs are delivered in a variety of formats including annual programs, workshops (classroom and on-farm), lectures, seminars, conferences, small group problem solving, interactive discussion groups, and county and regional meetings. On-farm troubleshooting and diagnostics are conducted at approximately 15-25 farms per year. In addition, presentations are made at educational meetings for producers and/or industry personnel on topics relating to dairy nutrition and management, which are a part of the overall goal to enhance the viability and profitability of dairying in MN. Some examples include:

- Four-State Applied Nutrition and Management Conference
- Four-State Dairy Management Seminar
- Minnesota Nutrition Conference
- Feeder Schools
- Transition Cow Workshop

Extension Scholarship

Proceedings (17):

Chester-Jones, H., R. Hall, B. Perry, D. Ziegler, **J. Linn**, and A. DiCostanzo. 2003. Effects of early calf nutrition on Holstein steer performance and carcass characteristics. *MN Cattle Feeder Rep.* B-494.

Linn, J. 2003. Energy in the 2001 Dairy NRC: Understanding the system. *Minnesota Dairy Herd Health Conf.* College of Veterinary Medicine, University of Minnesota, St. Paul. pp. 102-110.

Linn, J. 2003. Making high corn silage diets work. *Proc. Minnesota Dairy Conf. and Dairy Expo.* St. Cloud, MN. pp. 58-63.

Linn, J. 2003. Minerals in forages: Cow considerations. *Proc. Four-State Forage Conf.* pp. 31-36.

Linn, J.G. and M.I. Endres. 2003. Dry matter intake of group fed lactating dairy cows. *In: Proc. Four-State Applied Nutrition and Management Conf.* July 9-10, 2003. LaCrosse, WI. pp. 169-174.

Salfer, J., V. Oraskovich, M. Endres, and **J. Linn.** 2003. Keys to success in your dairy business: Cow health. *Proc. 2003 Minnesota Dairy Days.* pp. 3-9.

Allen, D. and **J. Linn.** 2002. Dry matter intake of lactating dairy cows. *Proc. 63rd Minnesota Nutrition Conf.,* September 17-18, 2002. Eagan, MN. pp. 86-98.

Linn, J. 2002. Protein in feed, milk and manure of dairy cattle. *Proc. Four-State (IA, IL, MN, WI) Dairy Management Seminar: Feeding and Management Practices to Maximize Profitability.* Midwest Plan Service Publ. 4SD12. pp. 39-46.

- Linn, J.**, and M. Raeth-Knight. 2002. Water quality for dairy cattle. Proc. Four-State (IA, IL, MN, WI) Dairy Management Seminar: Feeding and Management Practices to Maximize Profitability. Midwest Plan Service Publ. 4SD12. pp. 1-5.
- Linn, J.**, J. Salfer, and J. Paulson. 2002. Evaluation of the 2001 Dairy NRC energy and protein requirements. Proc. 63rd Minnesota Nutrition Conf. and Pre-conference Symp. September 17-18, 2002. pp. 98-112.
- Jung, H.G., **J.G. Linn**, J.F.S. Lamb, D.A. Samac, and D.A. Somers. 2001. Improving alfalfa fiber digestibility. Proc. Four-State (IA, IL, MN, WI) Dairy Nutrition and Management Conf. Midwest Plan Service. pp. 139-143.
- Marx, G.D., H. Chester-Jones, and **J.G. Linn**. 2001. Integration of alternative feeds into dairy cattle feeding programs. Proc. 62nd Minnesota Nutrition Conf. pp. 139-158.
- Salfer, J., and **J. Linn**. 2001. Selecting and managing TMR mixers. Proc. 26th Annual Minnesota Forage Conf. Detroit Lakes, MN. pp. 81-90.
- Allen, D., **J. Linn**, and W. Olson. 2000. Managing post-harvest quality of haylages. Proc. 25th Annual Minnesota Forage and Grassland Council Mtg.
- Linn, J.** and T. Nennich. 2000. What's new in corn silage – varieties, processing and analyzing. Proc. 25th Annual Minnesota Forage and Grassland Council Mtg.
- Linn, J.G.** and C. Kuehn. 1999. Evaluating corn silages for feeding value. Proc. Four-State Dairy Management Seminar. February 1999.
- Linn, J.G.** and N. Martin. 1999. Optimizing forage feeding on dairy farms. Proc. Four-State Dairy Management Seminar. February 1999.

Research reports published in Extension publications (12):

- Chester-Jones, H., R. Hall, B. Perry, D. Ziegler, **J. Linn**, and A. DiCostanzo. 2004. Effects of an intensive feeding program for Holstein bull calves from 1 week to 12 weeks of age on pre- and immediate post-weaning growth and subsequent overall feedlot performance and carcass characteristics. *In: Proc. 2004 Minnesota Dairy Days.* pp. 35-44.
- Heins, B.J., D.G. Johnson, **J.G. Linn**, W.P. Hansen, A.J. Seykora, and LB. Hansen. 2004. Crossbreeding at the University of Minnesota. *In: Proc. 2004 Minnesota Dairy Days.* pp. 32-34.
- Allen, D.M., C.S. Kuehn, **J.G. Linn**, W.P. Hansen, H.G. Jung, M.I. Endres, and M.L. Raeth-Knight. 2003. Effect of feeding different levels of forage NDF from corn silage in diets of lactating dairy cows. *In: Proc. 2003 Minnesota Dairy Days.* pp. 43-45.
- Nennich, T.D., **J.G. Linn**, D.G. Johnson, M.I. Endres, H.G. Jung, and M.L. Raeth-Knight. 2003. Comparison of feeding corn silage from leafy or high grain corn hybrids to lactating dairy cows. *In: Proc. 2003 Minnesota Dairy Days.* pp. 40-42.
- Torbert, L.A., **J.G. Linn**, M.L. Raeth-Knight, and K.S. Davis. 2003. Effects of protein supplementation during lactation on milk yield of primiparous Holstein cows. *In: Proc. 2003 Minnesota Dairy Days.* pp. 46-48.
- Visser, B.M., **J.G. Linn**, S.M. Godden, and M.L. Raeth-Knight. 2003. Effects of prefresh diet and post parturition drenching on early lactation performance multiparous Holstein cows. *In: Proc. 2003 Minnesota Dairy Days.* pp. 37-39.
- Kuehn, C.S., **J.G. Linn**, D.G. Johnson, H.G. Jung, and M.I. Endres. 2002. Effect of feeding corn hybrids selected for leafiness or grain to lactating dairy cattle. *In: Proc. 2002 Minnesota Dairy Days.* pp. 63-66.
- Linn, J.** 2002. Research activities at the St. Paul Dairy Barn. *In: Proc. 2002 Minnesota Dairy Days.* p. 74.
- Nennich, T.D., **J.G. Linn**, H.G. Jung, and J.M. Akayezu. 2002. A field study on brown midrib corn silage. *In: Proc. 2002 Minnesota Dairy Days.* pp.61-62.

- Olson, W.G., N. Auza, M. Schmitt, H. Chester-Jones, **J.G. Linn**, and M.J. Murphy. 2002. Survey of copper and other minerals in Minnesota Holstein dairy cattle: Soil, feed and liver concentrations. *In: Proc. 2002 Minnesota Dairy Days.* pp. 79-84.
- Olson, W.G., N. Auza, M. Schmitt, H. Chester-Jones, **J.G. Linn**, and M.J. Murphy. 2002. Survey of heavy metals in Minnesota Holstein dairy cattle: Soil, feed and liver concentrations. *In: Proc. 2002 Minnesota Dairy Days.* pp. 77-78.
- Quigley, J.D., H. Chester-Jones, G.D. Marx, **J.G. Linn**, D.M. Allen, D.M. Ziegler, and W.B. Hansen. 2002. Effects of processed erythrocyte protein (PEP) in milk replacers fed with 0 or 25% alfalfa leaf meal in calf starters on pre-weaning growth, health and efficiency of dairy calves. *In: Proc. 2002 Minnesota Dairy Days.* pp. 85-87.

Newsletters (9):

- Linn, J.** 2003. Good nutrition helps fight mastitis. Dairy Initiatives Newsletter. Vol. 12, Issue 1. Spring 2003. Department of Animal Science, University of Minnesota, St. Paul.
- Nennich, T. and **J. Linn**. 2002. Brown midrib and leafy corn silage hybrids (2 pages). Forage Update. January 2002. Minnesota Forage and Grassland Council.
- Salfer, J. and **J. Linn**. 2002. Winter feeding strategies for dairy cows (2 pages). Forage Update. November 2002. Minnesota Forage and Grassland Council.
- Linn, J.** 2001. Safety in silage bunker silos and piles. Dairy Initiatives Newsletter. Vol. 10, Issue 1, Spring 2001. Department of Animal Science, University of Minnesota, St. Paul.
- Allen, D., and **J. Linn**. 2000. Feeding dry corn silage. Dairy Update Issue 128. November 2000. Department of Animal Science, University of Minnesota, St. Paul.
- Godden, S., and **J. Linn**. 1999. Don't waste your protein. Dairy Initiatives Newsletter. Vol. 8, Issue 2, Fall 1999. Department of Animal Science, University of Minnesota, St. Paul.
- Linn, J.** 1999. Feeding strategies for hot weather: Nutritional changes can reduce production losses. Dairy Initiatives Newsletter. Vol. 8, Issue 1, Spring 1999. Department of Animal Science, University of Minnesota, St. Paul.
- Linn, J.**, D. Allen, and P. Nierman. 1999. Understanding milk protein. Dairy Initiatives Newsletter. Vol. 8, Issue 2, Fall 1999. Department of Animal Science, University of Minnesota, St. Paul.
- Paulson, J.C. and **J.G. Linn**. 1999. Alfalfa vs. corn silage as forages for dairy cattle. Forage Clippings. Vol. 6, No. 5, September 1999. Minnesota Forage and Grassland Council.