

# Lee J. Johnston

## Professor

**Appointment** 55% Research, 35% Extension, 10% Service

**Research Area** Swine Nutrition and Management

**Appointment History**

1999-present	Professor
1994-1998	Associate Professor
1988-1994	Assistant Professor

### Graduate Program Affiliations

Animal Sciences – Senior Member

### Professional and Honorary Societies

Member, American Society of Animal Science  
Member, American Association of Swine Veterinarians  
Member, Minnesota Pork Producers Association  
Member, Sigma Xi Scientific Research Society

### Five Most Significant Publications

**Reese, D., L. Johnston, R. Thaler, S. Carter, G. Hollis, T. Hartsock, J. Froseth, and B. Straw. 2004. *Farrowing Management*. Pork Education Resource Center, National Pork Board, Ames, IA.**

This multi-media training module was authored by a group of Swine Extension Specialists from around the U.S. for use in training workers in swine farrowing operations. The module has been used around the U.S. in face-to-face workshops, self-directed learning situations, and as a distance delivery course over the internet. This module provides curriculum for owners and managers of farrowing operations to use in training employees. Many workers in the swine industry have very little experience working with pigs and supervisors have limited materials available to train these workers. This module helps fill the void in training for these employees and improves the operation of farrowing facilities.

**Johnston, L.J., A. Renteria, and M.R. Hannon. 2003. Improving validity of on-farm research. *J. Swine Health Prod.* 11:240-246.**

Many swine veterinarians and feed industry consultants encourage pork producers to conduct experiments on their farms to evaluate products or management practices. Usually, these experiments are poorly designed and conducted and result in misleading information. Many of these advisors have very limited, if any, training in statistics and experimental design. This publication provides guidelines and tools to help swine veterinarians and consultants provide sound advice to producers that insist on conducting on-farm experiments. Staff at the National Pork Board said that they were considering writing a fact sheet on this topic but decided not to since my article was published.

**Trottier, N.L. and L.J. Johnston. 2001. Feeding gilts during development and sows during gestation and lactation. In: *Swine Nutrition 2<sup>nd</sup> Ed.* A.J. Lewis and L.L. Southern, Eds. CRC Press, LLC, Boca Raton, Florida.**

Swine Nutrition is one of the foremost textbooks on the topic of feeding pigs. Authors of chapters in this text are leading authorities in their respective fields of study. Our chapter on

feeding sows represents a comprehensive compilation of the science and practices surrounding feeding sows and gilts. This text is used in classrooms and as a reference book for other professionals in the swine industry.

**Johnston, L.J. 1998. Nutritional Programs Enhance Gilt Development. *National Hog Farmer, Blueprint Series. April 15. (Invited paper)***

Nutrition and management of gilts during development is an area surrounded by folklore and conflicting recommendations. My paper attempted to cut through the many conflicting approaches and discuss feeding practices that are based on sound scientific evidence. The "Blueprint Series" of *National Hog Farmer* is read by industry professionals and leading-edge pork producers. A recent paper on this same subject for the 2004 Pork Academy was based on my Blueprint Series article because of the comprehensive nature of my paper.

**Johnston, L.J. 1995. Use of low-test-weight corn in swine diets and the lysine/protein relationship in corn. *Swine Health and Production* 3:161.**

Growing conditions in the Upper Midwest region of the U.S. in 1994 resulted in a poor quality corn crop with low-test weight. Pork producers and industry professionals were concerned about the best way to use this corn in swine feeding programs. This publication outlined the science behind feeding recommendations. I received requests from producers and feed industry consultants across the U.S. for this publication.

**Refereed Journal Publications and Book Chapters (Last Five Years)**

Authored or co-authored the following 10 papers in peer-reviewed journals and 1 book chapter.

- Gessel, P.D., N.C. Hansen, S.M. Goyal, **L.J. Johnston**, and J. Webb. 2004. Persistence of zoonotic pathogens in surface soil treated with different rates of liquid pig manure. *Appl. Soil Ecology* 25: 237-243.
- Johnston, L.J.**, C.J. Clanton, C. Ajariyakhajorn, and S.M. Goyal. 2003. Survival of pathogenic indicator organisms in stored swine manure containing ground piglet carcasses during cold temperatures. *Appl. Eng. Ag.* 19(4):491-497.
- Johnston, L.J.**, J.E. Pettigrew, S.K. Baidoo, G.C. Shurson, and R.D. Walker. 2003. Efficacy of sucrose and milk chocolate product or dried porcine solubles to increase feed intake and improve performance of lactating sows. *J. Anim. Sci.* 81:2475-2481.
- Johnston, L.J.**, A. Renteria, and M.R. Hannon. 2003. Improving validity of on-farm research. *J. Swine Health Prod.* 11:240-246.
- Brumm, M.C., M. Ellis, **L.J. Johnston**, D.W. Rozeboom, D.R. Zimmerman, and NCR-89 Committee on Swine Management. 2002. Effect of removal and remixing light weight pigs on performance to slaughter weights. *J. Anim. Sci.* 80:1166-1172
- Brumm, M.C., M. Ellis, **L.J. Johnston**, D.W. Rozeboom, D.R. Zimmerman, and NCR-89 Committee on Swine Management. 2001. Interaction of swine nursery and grow-finish space allocations on performance. *J. Anim. Sci.* 79:1967-1972.
- Leibbrandt, V.D., **L.J. Johnston**, G.C. Shurson, J.D. Crenshaw, G.W. Libal, and R.D. Arthur. 2001. Effect of nipple drinker water flow rate and season on performance of lactating swine. *J. Anim. Sci.* 79:2770-2775.
- Yang, H., G.R. Foxcroft, J.E. Pettigrew, **L.J. Johnston**, G.C. Shurson, A.N. Costa, and L.J. Zak. 2000. Impact of dietary lysine intake during lactation on follicular development and oocyte maturation after weaning in primiparous sows. *J. Anim. Sci.* 78:993-1000.
- Yang, H., J.E. Pettigrew, **L.J. Johnston**, G.C. Shurson, and R.D. Walker. 2000. Lactational and subsequent reproductive responses of lactating sows to dietary lysine (protein) concentration. *J. Anim. Sci.* 78:348-357.

Yang H., J.E. Pettigrew, **L.J. Johnston**, G.C. Shurson, J.E. Wheaton, M.E. White, Y. Koketsu, A.F. Sower, and J.A. Rathmacher. 2000. Effects of dietary lysine intake during lactation on blood metabolites, hormones, and reproductive performance in primiparous sows. *J. Anim. Sci.* 78(4):1001-9.

### Book chapter:

Trottier, N.L. and **L.J. Johnston**. 2001. Feeding gilts during development and sows during gestation and lactation. *In: Swine Nutrition 2<sup>nd</sup> Ed.* A.J. Lewis and L.L. Southern, Eds. CRC Press, LLC, Boca Raton, Florida. pp. 725-769.

### **Awards**

Pohl, S., R. Thaler, M. Brumm, R. Stowell, J. Harmon, D. Stender, J. Weiss, **L. Johnston**, and L. Jacobson. 2004. Use of a mobile ventilation laboratory (VL) for hands-on training of pork producers in building ventilation. *J. Anim. Sci.* Midwest Section Abstr. No. 68. This abstract earned the **2004 Innovation Award** in the Outreach category sponsored by the National Pork Board.

Outstanding Graduate Faculty Award, 2003. Awarded by Animal Science Graduate Club.

**Johnston, L.J.**, C.J. Clanton, C. Ajariyakhajorn, and S.M. Goyal. 2003. Survival of pathogenic indicator organisms in started swine manure containing ground piglet carcasses during cold temperatures. *Appl. Eng. Ag.* 19(4): 491-497. **Honorable Mention Paper Award** from American Society of Agricultural Engineers, awarded in 2004.

**Johnston, L.J.**, and J.A. Sterle. 2002. Use of a hands-on workshop to teach swine reproductive management to farrowing barn workers. *J. Anim. Sci.* 80(Suppl. 2):48(Abstr.). This abstract earned the **2002 Innovation Award** in the Outreach category, sponsored by the National Pork Board.

### **Funding (Last Five Years) – \$114,690**

**Zymetrics, Inc.** Phytase (Quantum Tm) low phosph. S. Baidoo (PI). 2004-04. \$52,838.

**MN Pork Producers Association.** Welfare, meat quality, growth. 2002-04. \$20,000.

**National Pork Board.** Enhancing sow welfare high fiber. 2002-04. \$78,940.

**MN Pork Producers Association.** Biological and economic performance of pigs housed in hoop barns. 2001-03. \$11,250.

**Nutrifeeds.** Dried porcine solubles for sows. 1999-2000. \$4,500.

### **Graduate Student and Post-doctoral Supervision - Current Advisees**

Jonathan P. Holt                      M.S.                      Animal Sciences

### **Dissertations and Theses (Last Five Years)**

Name	Program	Degree	Title
J. Antonio Renteria-Flores (co-advisee)	Animal Sciences	Ph.D.	Effects of soluble and insoluble dietary fiber on diet digestibility and sow performance.

### **Courses Taught (Last Five Years)**

Designator	Name	Cr	% Effort	Term	Years
AnSc 8340	Concepts and Dev in Swine Nutr.	3	30%	Fall	2001, 2002

## Service

Reviewer, *Journal of Animal Science*

Co-Chair, Minnesota Nutrition Conference

Member, Alternative Swine Housing Task Force

Member, National Pork Board Swine Educators Committee

Member, Instructional Training Team for Swine Welfare Assurance Program

Member of the Swine Center Steering Committee

Coach, Stevens County 4-H Livestock Quiz Bowl teams.

Participated in a study tour of group-housing systems for sows in Sweden. Trip funded by the Alternative Swine Housing Task Force and Hilda Parks Foundation.

Attended the Biennial Meeting of the Australasian Pig Science Society held in Adelaide, Australia.

Consulted with Bunge Meats Corporation on design of group housing for sows.

## Service to National and Regional Research Committees

University of Minnesota's representative to the NCR-89 Committee

## Proceedings and Invited Lectures (Last Five Years)

**Johnston, L.J.**, S. Noll, A. Renteria, and J. Shurson. 2003. Feeding by-products high in concentration of fiber to nonruminants. *In: Proc. 3<sup>rd</sup> National Alternative Feeds Sym. Western Regional Coordinating Committee, Kansas City, MO. November, 2003.*

Morrison, R., and **L. Johnston**. 2003. Handling and sorting pigs in large groups housed in deep-litter systems. *In: Proc. 2<sup>nd</sup> International Conf. on Swine Housing. Research Triangle Park, NC. ASAE, 2003, 196-200.*

Shurson, J., M. Spiehs, M. Whitney, S. Baidoo, and **L. Johnston**. 2001. Feeding distiller's dried grains with solubles to swine. Rural Economic Value-Added Mentoring Program. Iowa Department of Agriculture and Land Stewardship, Des Moines, IA. March 20, 2001.

Shurson, J., M. Spiehs, M. Whitney, S. Baidoo, and **L. Johnston**. 2001. The value of distiller's dried grains with solubles in swine diets. Ethanol Co-products Workshop. National Corn Growers Association, Lincoln, NE. November 7-9, 2001.

Jacobson, L.D., J. Van Der Pol, and **L.J. Johnston**. 2000. Remodeling and designing of an extensive pig production system for Minnesota. *In: Proc. First International Conf. on Swine Housing. Amer. Soc. Agric. Eng. pp. 267-272.*

**Johnston, L.J.** 2000. Back to basics: Farrowing management practices. *In: Proc. 2000 P.O.R.K. Academy. National Pork Producers Council. pp. 113-128.*

**Johnston, L.J.** 2000. Body condition scoring sows. University of Missouri Farrowing Workshop training materials. 5 pages.

**Johnston, L.J.** 2000. Creep feeding and pig fostering. University of Missouri Farrowing Workshop training materials. 4 pages.

**Johnston, L.J.** 2000. Environmental considerations for the sow and the pig. University of Missouri Farrowing Workshop training materials. 6 pages.

**Johnston, L.J.**, S. Baidoo, and J. Shurson. 2000. Everything but the squeal. *Morris Sun-Tribune Ag. Supplement. March, 2000.*

## Extension Activities (Last Five Years)

### Program Team Involvement and Goals

#### The major programs include:

#### Training Programs for Swine Farm Workers

Audience: Minnesota pork producers and swine farm workers

Goal: Improve the production expertise of workers in commercial swine operations.

**Swine Welfare Assessment Program (SWAP), Contributor**

Audience: Certified SWAP educators

Goal: Provide training for certified SWAP educators in Minnesota and the surrounding states.

**Alternative Swine Housing**

Audience: Pork producers and industry professionals

Goal: Provide current information to pork producers and industry professionals on housing swine in large groups with deep bedding.

**Interpreting Pork Production Records, Contributor**

Audience: Pork producers

Goal: Help pork producers interpret output from the National Database on Biological and Production Standards and provide resource information to aid correction of suboptimal performance.

**Improving Expertise of Farrowing Barn Workers**

Audience: Minnesota Pork Congress attendees

Goal: Present information on proper preparation of farrowing facilities and the beneficial effects of good stockmanship on sow reproductive performance.

**Farrowing Management, Contributor**

Audience: Minnesota pork producers

Goal: Provide farrowing management information directly to pork producers.

**Model Swine Ventilation Room Demonstration Project, Contributor**

Audience: Minnesota pork producers and industry professionals

Goal: Give producers and their employees the opportunity to learn about ventilation and temperature systems, and to practice setting controls, inlets and fans using a model swine ventilation training room on wheels for hands-on demonstrations and practice.

**Improving Production Expertise of Producers, Contributor**

Audience: Minnesota pork producers

Goals:

- Improve the technical abilities of pork producers by presenting them with up-to-date production practices.
- Develop educational materials and venues for pork producers.

**Improving Science Literacy of Non-Farm Citizens**

Audience: Elementary school students

Goals:

- Teach students the scientific method and effects of nutrition on animal growth.  
serve as an advisor to elementary schools students as they develop their science fair projects.

**Product Development (selected materials developed)**

- Swine Farm Workers Training curriculum (4-5 hrs/wk for 3-5 wks + 1 hands-on session. Co-developer.
- Editor of proceedings for the Minnesota Nutrition Conference, 1997-2004.
- Resource Manual to help pork producers interpret output from the National Database on Biological and Production Standards. Co-developer.

## Program Delivery Events

Programs are delivered in a variety of formats including, workshops (classroom and on-farm), lectures, seminars, conferences, interactive discussion groups, and county and regional meetings. On-going interactions with producers also occur by telephone and email. Many specialists are enlisted by both the Minnesota Pork Producers Association and the National Pork Board to help with educational efforts at the Minnesota Pork Congress and the World Pork Expo. Faculty activities range from staffing a booth to interacting with producers to presenting educational seminars to designing and conducting workshops. Some examples include:

- Model Swine Ventilation Workshops
- Farrowing Management Training Workshops
- Seminars on Improving Expertise of Farrowing Barn Workers
- Seminars on Improving Production Expertise of Producers
- Alternative Swine Housing Workshops
- Minnesota Nutrition Conference

## Extension Scholarship

### Proceedings (7):

- Johnston, L.J.** 2003. Nutrition of pigs in stressful conditions. *In Proc. of Seminar on Swine Nutrition.* U.S. Grains Council. Presented in Hanoi and Ho Chi Minh City, Vietnam.
- Johnston, L.J.** 2002. Fiber nutrition of sows. *In Proc. 63rd Minnesota Nutrition Conf.* Eagan, MN. pp. 217-231.
- Johnston, L.J.** 2002. Nutritional methods of improving swine breeding herd productivity. *In Proc. of Seminar on Swine Breeding Herd Management.* U.S. Grains Council. Presented in Can Tho, Ho Chi Minh City and Hanoi, Vietnam.
- Johnston, L.J.** and A. Renteria. 2002. Conducting trials in the breeding herd. *In Proc. Allen D. Leman Swine Conf.* pp. 99-101.
- Shurson, G.C., M.J. Spiehs, M.H. Whitney, S.K. Baidoo, **L.J. Johnston**, B. Shanks, and D. Wulf. 2001. The value of distiller's dried grains with solubles in swine diets. *In Proc. 62nd Minnesota Nutrition Conf. and Minnesota Corn Growers Association Technical Symp.* Bloomington, MN. September 11-12, 2001. pp. 22-52.
- Johnston, L.J.** 2000. Computer-based training materials for production employees. *In Proc. University of Minnesota Pork Conf.* pp. 63-65.
- Shurson, J., M. Spiehs, M. Whitney, S. Baidoo, and **L. Johnston**. 2000. The value of distiller's dried grains with solubles in swine diets. *In Proc. Minnesota Nutrition Conf.* pp. 22-52.

### Newsletters:

- Johnston, L.J.** 2002. Managing Pigs Under Stressful Conditions. Newsletter of U.S. Grains Council in Southeast Asia.

### Other publications (7):

- Johnston, L.J.** 2002. New design eases handling in hoops. *National Hog Farmer Swine Research Review.*
- Johnston, L.J.** 2002. Successful farrowing management practices. Factsheet published by Monsanto Choice Genetics for distribution to clients.
- Johnston, L.J.** and A. Renteria. 2002. Conducting trials in the breeding herd. *Proc. Allen D. Leman Swine Conf.* pp. 99-101.
- Shurson, J., M. Whitney, **L. Johnston**, B. Koehler, R. Hadad, and D. Koehler. 2002. Designing feeding programs for natural and organic pork production. University of Minnesota Extension Service Bulletin 07736-BU.

- Johnston, L.J.** 2001. Farrowing management. *Pig Progress*. 17:25-27. (Pig Progress is an international magazine on pig production published in Holland.)
- Johnston, L.J.** 2001. Nutritional management of lactating sows according to environment and productivity. Handout distributed at Purdue University Farrowing Management Course.
- Johnston, L.J.** 2001. Piglet processing and management. Handout distributed at Purdue University Farrowing Management Course.