

# ORGANIC LIVESTOCK RESEARCH SURVEY

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## The Growing Organic Livestock Industry

In the United States, it has only been legal to label meat as “organic” since February, 1999. Because of this, the organic livestock industry is still very much in its infancy, but production is growing rapidly. Certified organic pasture and rangeland more than doubled between 1997 and 2001, and was up 28 percent from 2000 to 2001, mirroring the rapid expansion in organic livestock and poultry. The number of certified organic beef cattle, milk cows, hogs, pigs, sheep, and lambs was up nearly four-fold since 1997, and up 27 percent from 2000 to 2001. Poultry animals raised under certified organic management – including laying hens, broilers, and turkeys – showed even higher rates of growth during this period.

With the Organic Foods Production Act now in force, and with consumer demand for organic products growing at over 20 percent per year, research is needed to support livestock producers who choose to enter this growing sector.

## Survey of Organic Livestock Research Needs

During May and June 2003, the author constructed a list of potential topics to include a survey of organic livestock research needs. The topics were selected based on the author’s experiences as an organic producer and inspector. In addition, topics were selected from the Organic Farming Research Foundation (OFRF) annual survey of organic farmers and ranchers; the final report of the Network for Animal Health and Welfare in Organic Agriculture, a European Union funded Concerted Action Network; a list of research topics submitted by Ron Rosmann, Rosmann Family Farms, Harlan, IA (president of OFRF Board); a list of Critical Needs for Extension Identified at Organic Inservice compiled by Penn State University; and a report entitled “Health and Welfare in Organic Livestock Systems” by Dr. Michael Meredith, Sunflower-Health, UK.

The author compiled a draft list of research topics. The list was circulated via email discussion groups frequented by organic inspectors, certifiers, researchers, and producers. Comments were solicited. In July 2003, comments were incorporated to construct the final survey questionnaire.

Organizers posted the survey of organic livestock research needs on the website of the University of Minnesota’s Minnesota



Institute for Sustainable Agriculture ([www.misa.umn.edu](http://www.misa.umn.edu)) in August and September 2003. The survey was conducted to help the University of Minnesota and other research institutions meet the needs of the organic livestock industry.

Respondents prioritized organic livestock research topics in ten categories. Respondents were also invited to submit research ideas of their own. Notice of the survey was circulated throughout the U of MN system, and to organic certification agencies, organic producer groups, organic inspectors, and sustainable agriculture e-mail discussion groups. In addition, one organic dairy company printed the survey and mailed it to its producers.

Respondents were asked to provide information on their places of residence and occupations. Respondents were asked to indicate if they were crop farmers, organic crop farmers, livestock producers, organic livestock producers, researchers, certifiers, inspectors, or other. Respondents were not limited to choosing one occupation.

## **Participants**

A total of 203 people completed the survey. Minnesota had the highest number of respondents at 32. New York was second with 24. There were 22 from Wisconsin; 15 from Iowa; 11 from Pennsylvania; 9 each from Illinois and Washington; 8 from Canada; 7 from Wyoming; and 5 each from California and Vermont.

Seventy-four respondents indicated that they were organic livestock producers. There were 39 organic crop farmers, 35 livestock producers, 32 researchers, 13 inspectors, 12 certifiers, 5 crop farmers, and 57 who selected other.

## Method of Analysis

Respondents were asked to review the list of research topics and indicate the level of priority that should be assigned to each topic, on a scale of 1 to 5, with 1 being the lowest and 5 being the highest. Mean scores for each topic were calculated by adding all scores and dividing by the number of responses for that topic. Median (the middle score of an ordered list of scores) and mode scores (the most frequent score) were also calculated for each topic, using the PROC UNIVARIATE procedure of SAS.

An index was calculated for each topic to take into account the mean, median, and mode scores as well as the number of responses for the topic; as follows:  $\text{Index} = (\text{mean} + \text{median} + \text{mode}) * (\text{number of responses} / 203)$ .

203 is the total number of submitted surveys. Thus, the index accounts for both the willingness of survey respondents to spend time scoring a given survey topic, as well as the relative approval of it as a research topic by those who chose to answer.

The topics were ranked using the index score, both within the ten broad categories and across all categories. The ranking across all categories was then used to find the “Top Twenty” research topics. Because the number of responses to a topic was part of the index score, it tended to weigh against topics from “minor” species such as goats/sheep and bees appearing in the Top Twenty. Those with an interest in these categories can check the ranking of topics within the categories.

## Research Needs Identified

Sorting the responses by index scores showed that respondents are most interested in the following general research topics:

- economics and profitability of organic livestock production;
- approved organic methods of parasite management;
- the relationship between organic soil building methods and livestock health and nutrition;
- analysis of the nutritional and health value of organic livestock products; and
- approved health care options for livestock.

The need to catalog animal health problems for various species and list approved health care options and allowed medications scored the highest of any single topic.

Responses to the listed items, combined with respondent comments, revealed two strong trends: 1) the need for a holistic “systems” approach for organic livestock research; and 2) a widespread need for improved processing, handling, and distribution systems for approved inputs (feed, feed supplements, and medications) and for organic livestock products.

## Top Twenty Topics

The following topics were ranked, according to index scores, as the highest priorities for organic livestock research by survey respondents:

1. Catalog animal health problems for various species, listing approved health care options and allowed medications.
2. Analyze the nutritional and health value of organically produced livestock products, especially pasture raised or grass fed livestock.
3. Explore impacts of “systems” approach (rotational grazing, multi-species grazing, etc.) on internal and external parasite loads for various species.
4. Organic methods of building soil fertility to optimize livestock health and thereby reduce or eliminate the need for medications, vaccines, parasiticides, and supplemental vitamins and minerals.
5. Organic Best Management Practices (OBMPs) for least-toxic parasite management for various species.
6. OBMPs for prevention and treatment of mastitis.
7. Examine naturally occurring sources of vitamins and minerals within organic feed compared to use of supplementation materials.
8. Analysis of distribution channels used for organic livestock products and recommendations for improved processing, handling, and distribution systems.
9. Manure management systems which do not contaminate crops, soil, or water with plant nutrients, heavy metals, or pathogenic organisms and which optimize recycling of nutrients.
10. Livestock record keeping systems for sound management, profitability, and organic certification compliance.
11. Comparison of investments needed, rate of return, and profitability of organic and non-organic livestock systems.
12. Study impacts of organic livestock operations on local and regional economic development.
13. Analyze how livestock production impacts the entire diversified organic farm, including impacts on fertility management; weed, pest, and disease pressure; utilization of resources; water quality; farm labor; and profitability.
14. Market survey of supply and demand for organic meat products in the Upper Midwest.
15. Breeds of various species best suited to organic production – feed utilization, grazing response, disease and parasite resistance, ease of reproduction, and minimization of stress.
16. Nutritional value of weeds, how they can best be utilized in livestock diets, and threshold levels for inclusion in livestock rations.
17. Comparison of grain-based organic livestock systems with grass-based organic systems.
18. OBMPs for least-toxic fly control. Examine holistic strategies, including: 1) augmentation or introduction of predators or parasites; 2) development of habitat for natural enemies; 3) non-synthetic controls such as lures, traps, and repellents; 4) manure management systems; 5) pasture rotation; 6) use of clean, dry bedding; and 7) impact of moisture control.
19. OBMPs for the prevention of various diseases in various livestock species and breeds.
20. Organic management systems to produce high quality beef – grade, tenderness, flavor, etc.

## Respondent Comments

The comments submitted by respondents provide a wealth of innovative ideas for organic livestock research projects. Many comments contained ideas not included in the list of survey topics. Others provided further details or reinforced the importance of topics already included in the survey. While the discussion below presents a sampling of comments submitted, the full list of comments in the body of this report contains numerous suggestions which merit consideration.

In the “General” category, three respondents suggested a need for in-depth research into a whole farm systems approach for livestock production. As one commentor stated, “It is not enough to have a farm where organic hay is grown.” Two commentors advised a study of management practices on the most successful existing organic farms. Two others recommended a study of the impacts of converting to organic livestock production in terms of costs, time frame of conversion, equipment needs, labor intensity, and profitability.

On the subject of livestock health care, three respondents mentioned the need to explore use and efficacy of alternative health care products, e.g. flax meal, kelp, probiotics, homeopathy, herbs, hydrogen peroxide, etc. Others mentioned the need to study preventative health care practices and the impacts of confinement systems on animal health.

Concerning housing and living conditions, two commentors suggested that researchers evaluate interspecies stocking in same pastures and rotational grazing systems in terms of impacts on parasite control and noxious weeds. Other respondents mentioned temporary and portable housing designs; alternative energy sources for heating or cooling; and natural, cost effective ventilation systems. An innovative suggestion for research is an analysis of the agro-ecological impacts of clean in place (CIP) soaps, acids, and sanitizers used in milk houses that are added to manure, then applied to fields.

Three respondents cited a need to analyze the nutritional and health benefits of pastured poultry. Three others suggested a study of alternative processing and cooling for poultry, including on-farm, outdoor, and mobile units. Others stated the need for a nationwide inventory of organic poultry processing facilities.

For organic dairy research, three respondents suggested studies to re-design milk houses to fit grazing systems and micro-dairy enterprises. Others suggested evaluation of nurse-cow rearing as an alternative enterprise; research into pasture species mixtures that improve animal productivity and extend the grazing season; alternative feed sources (high energy feeds, molasses, distillers grains, sunflower seeds, and/or hulls); and herbs and other plants to grow to optimize cattle health in pastures and hedge rows. Others encouraged an analysis of various breeds that best fit organic dairy production and a study for conjugated linoleic acid

(CLA) and omega-3 fatty acids in organic dairy products.

Concerning beef production, four respondents suggested a need to study breed and line selection for organic beef operations, i.e. which breeds perform best in organic systems? Others mentioned the need to research E. coli H7-0157 prevention in organic grass-fed animals and organic animals fed a combination of grass and grain. One commentor suggested a study on how organic meat processing can best simultaneously satisfy USDA meat inspectors and be compliant with NOP standards. An innovative commentor encouraged research on feeding kelp for pinkeye control. Others suggested the need for research on conventional vs. organic carcasses to analyze chemical and antibiotic residues and to analyze for CLA and omega-3 fatty acids in pastured organic beef.

Four commentors mentioned the need for research on organic best management practices and feed conversion ratios for pastured hog operations. Four suggested studies of breed selection for organic hog operations, i.e. which breeds perform the best in organic systems in terms of foraging, health, reproduction, profitability, and meat quality.

In the category “Sheep and Goats,” four respondents suggested research on management strategies and approved parasiticides for sheep and goats. Three encouraged analysis of multi-species grazing systems, combining sheep/goats with cattle.

Concerning bees and beekeeping, five commentors saw a need to research organic best management practices and approved inputs for varroa mite and fungus control. Two suggested research on the effects of GMO's on bees. Several suggested research on foraging distance of bees in various environments; forage behaviors as they affect organic compliance; and research on the best flowering plant types to plant in/along fields for prolonged nectar and pollen production. There were two suggestions for analysis comparing hive production, bee health, and chemical residues in organic vs. non-organic locations.

In the area of economics, seven respondents mentioned the need to investigate methods and develop courses for farmers and businesses on how to implement a network of small scale slaughter/processing facilities and associations. Three cited a study of cooperatives as a cost sharing vehicle for meat and dairy product production and marketing. Three more suggested research to help establish, maintain, and/or work with existing alternative marketing models, (i.e. Community Supported Agriculture, local food initiatives) to market organic livestock products. Three mentioned the need for an economic analysis of value-added meat enterprises, while two others suggested economic analysis slaughter and processing facilities, including the legal feasibility of different options. The prevalence of related comments indicates a strong need to investigate the availability of organic livestock processing facilities and the need for information on how to locate or create them.

## Detailed Results for All Categories

Survey results are presented below for all categories. Topics are listed in order of priority, based on index scores. Research ideas submitted by respondents appear at the end of each category, under the subject line "Comments". Comments which were submitted by multiple respondents appear at the top of the lists of comments. Other comments are presented without prioritization.

### General

1. Analyze the nutritional and health value of organically produced livestock products, especially pasture raised or grass fed livestock.
2. Explore impacts of "systems" approach (rotational grazing, multi-species grazing, etc.) on internal and external parasite loads for various species.
3. Organic methods of building soil fertility to optimize livestock health and thereby reduce or eliminate the need for medications, vaccines, parasiticides, and supplemental vitamins and minerals.
4. Organic Best Management Practices (OBMPs) for least-toxic parasite management for various species.
5. Analyze how livestock production impacts the entire diversified organic farm, including impacts on fertility management; weed, pest, and disease pressure; utilization of resources; water quality; farm labor; and profitability.
6. Breeds of various species best suited to organic production – feed utilization, grazing response, disease and parasite resistance, ease of reproduction, and minimization of stress.
7. Nutritional value of weeds, how they can best be utilized in livestock diets, threshold levels for inclusion in livestock rations.
8. Comparison of grain-based organic livestock systems with grass-based organic systems.
9. OBMPs for least-toxic fly control. Examine holistic strategies, including: 1) augmentation or introduction of predators or parasites; 2) development of habitat for natural enemies; 3) non-synthetic controls such as lures, traps, and repellents; 4) manure management systems; 5) pasture rotation; 6) use of clean, dry bedding; and 7) impact of moisture control.
10. Develop OBMP checklist to help producers evaluate all aspects of the farm and create action plans for successful conversion.
11. Approved weed control strategies for pasture and forage management, especially for noxious weeds such as thistle.
12. Analysis of successful conversion strategies to develop OBMPs for the conversion of various types of livestock operations to organic production.
13. Investigate anecdotal reports of improved livestock health with organic management – review of on-farm case studies.
14. Utilization of alternative grains to corn and soybeans which fit into organic crop rotation systems.



### Comments:

- In-depth research into a whole farm systems approach. It is not enough to have a farm where organic hay is grown.
- Study management practices on most successful existing organic farms.
- Costs, time frame of conversion, equipment needs, labor intensity. Profitability!
- Investigate the prevalence of organic processing facilities and how to locate or create them in each state.
- Define and describe housing and management systems that "allow animals to express their natural behaviors."
- Explore grass/grain combinations for animal production and finishing beef .
- Effects of maintaining a healthy biodiversity of consumable grains, forages, and other feedstuffs for organic livestock.
- Explore alternative feed crops to be raised on small farms that store well, i.e., mangles (fodder sugar beets), comfrey, root crops.
- Examine efficiencies of intercropping systems to produce food for livestock and people.
- Research the effect of using sprouted/germinated grains in feed rations.
- Impacts of cultivating live soil bacteria to enhance composting and nutrient take up by plants.
- Studies on the use of fish meal and fish oil as feed ingredients from "sustainable" fisheries.
- In the deep south, organic livestock production is primarily limited by parasite management and lack of organic grain. Recognize regional differences.
- Breeding parasite resistant lines of animals suitable to organic production. Lines within breeds may vary as much or more than breeds.
- Parasite control in pigs and livestock is a major limiting factor.
- Alternative treatment research - homeopathy, herbal tinctures, acupuncture, etc.
- Effects of kelp and/or kelp/salt combo to prevent pinkeye in rotationally grazed cattle.
- Alternative medical practices for young livestock.
- Develop testing methods to measure quality of organic food vs. chemically produced.
- Rigorous evaluation of welfare of organically raised livestock.
- Investigate environmental impacts of organic livestock farming.
- Appearance and opportunity for organic farms in urban/rural edge land areas.



## Livestock Health Care

1. Catalog animal health problems for various species, listing approved health care options and allowed medications.
2. Examine naturally occurring sources of vitamins and minerals within organic feed compared to use of supplementation materials.
3. OBMPs for the prevention of various diseases in various livestock species and breeds.
4. Efficacy studies, conducted under certified organic conditions, of approved health care practices and allowed medications for various species and age groups, including calf-hood medications.
5. Efficacy of vaccines used in organic systems.
6. Review of non-approved medications against criteria for organic use to determine compatible products and/or formulations not currently approved.
7. Efficacy trials of approved mineral and vitamin supplements for various species.
8. Inventory of non-genetically engineered and genetically engineered vaccines.
9. Water quality and livestock health – impacts of nitrate, coliform, and/or pesticide residues on various species.
10. Physical alterations for various species which promote animal welfare while minimizing pain and stress, including the branding and dehorning of breeding, slaughter, and dairy animals.

### Comments:

- Explore use and efficacy of alternative health care products, e.g., flax, kelp, probiotics, homeopathy, herbs, hydrogen peroxide, etc.
- Impact of confinement on livestock health and resulting need for medications.
- Alternative feed rations other than traditional corn and soy to help offset organic feed costs.
- Cataloging of homeopathic treatments and best uses for which livestock species.
- Preventative health care practices.



## Housing and Living Conditions

1. Manure management systems which do not contaminate crops, soil, or water with plant nutrients, heavy metals, or pathogenic organisms and which optimize recycling of nutrients.
2. Winter housing designs which provide outdoor access while maximizing the health and productivity of animals.
3. Role of facility sanitation in promoting livestock health.
4. Outdoor and indoor living conditions and stocking rates for various species which accommodate health and natural behavior.
5. Research housing designs which promote health, minimize stress, and maximize production for various species in various regions.

6. Air quality impact on livestock health – various species.
7. Alternatives to lumber treated with copper chromium arsenate or other prohibited materials for fence posts and building materials.
8. Review costs and benefits associated with temporary confinement of various species and production systems.

### Comments:

- Evaluate interspecies stocking in same pasture/rotational grazing for animal health: parasite control and noxious weeds.
- Benefits of using deep bedding for various species.
- Natural, cost effective ventilation systems.
- Multi-species rotation for land and animal health potential.
- Temporary and portable housing designs.
- Portable calf pens on grass easily moved by one person.
- Costs and designs of livestock housing utilizing alternative energy sources for heating or cooling.
- Summer housing/shade impact of health and productivity.
- Review costs and benefits of different aquaculture production systems for organic certification.
- Agro-ecological impact of clean in place (CIP) soaps, acids, and sanitizers added to manure, then applied to fields.
- Out-wintering on pasture.
- Define and describe circumstances that require temporary confinement for various species.

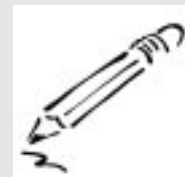


## Poultry

1. Review of poultry breeds that are best adapted for outdoor access.
2. Investigate impact of outdoor access on disease exposure and incidence in organic flocks.
3. Meeting the nutritional needs of poultry within the restrictions of the organic standards, i.e. feed rations with no synthetic methionine.
4. OBMPs for poultry outdoor access - investigation of system designs which meet organic requirements.
5. Efficacy of various rations using organic feed ingredients and approved feed supplements for broilers, layers, and turkeys.
6. Amino acid concentrates for poultry derived from organic agricultural products.
7. Alternatives to beak trimming of laying hens – breed selection, housing, stocking rate, gender mix, breed combinations, ration, diversions, and activities.
8. Organic hatchery management; systems design/operation.

### Comments:

- Analyze nutritional and health benefits of pastured poultry.
- Alternative processing and cooling for poultry, including on-farm, outdoor, and mobile units.
- Nationwide inventory of organic poultry processing facilities.
- Potential markets.
- Review of innovative system designs for pastured poultry – both broilers and layers.
- Poultry breeds adapted to pasturing.
- Breed selection for amino acid utilization and growth potential.
- Nationwide inventory of certified organic feed mills and products.



**Poultry Comments Continued:**

- Organoleptic (taste, smell, and visual appeal to consumers) comparison of pastured vs. confined poultry.
- Study the ration levels of flaxseed needed to produce high omega-3 fatty acids in eggs.
- Poultry housing alternatives with natural ventilation.
- Diagrams showing housing systems 100 percent adaptable for the disabled.
- Examination of benefits of multi-species, bio-stacking concepts in relation to poultry keeping.
- Insect controls and population dynamics due to poultry grazing/foraging activity within crop areas.



**Dairy**

1. Organic Best Management Practices (OBMPs) for prevention and treatment of mastitis.
2. OBMPs for least-toxic fly control for dairy.
3. Compile and analyze existing research results on organic rotational grazing.
4. OBMPs for least-toxic parasite management for dairy cattle, including calves.
5. OBMPs for calf management and system designs which maximize health and productivity and allow for expression of natural behavior.
6. Evaluation of seasonal dairying - analysis of impacts on land, costs, and how this could fit into a diversified organic farming operation.
7. Evaluation of teat dip formulations for efficacy and compliance with organic regulations.
8. Milk replacers comprised of organic ingredients and approved materials.

**Comments:**

- Re-design milk house to fit grazing systems.
- Regulatory requirements for micro-dairying.
- Approved dry cow treatments.
- Cost/benefit analysis of the dairy herd conversion regulation under NOP.
- Keeping calf on the mother and weaning in six months.
- Evaluate nurse-cow rearing as an alternative enterprise, especially dairy beef.
- Long-term research on on-farm bred, on-farm fed cows.
- Research into pasture species mixtures that improve animal productivity and extend grazing season.
- Alternative feed sources (high energy feeds, molasses, distillers, sunflower seeds, and or hulls).
- Herbs and other plants to grow to optimize cattle health in pastures and hedge rows.
- Analyze various breeds that best fit organic dairy production.
- Practical, definitive animal identification technology to ensure unambiguous herd membership.
- Study for CLA, omega-3 fatty acids in dairy products from different organic production systems.
- Role of increased Omega 3 fatty acids in cows milk intended for human infant nutrition.
- Use of ultraviolet/pressure pasteurization.
- Research types of machinery and practices being utilized by the disabled.
- Alternative housing systems with natural ventilation.
- Evaluation and problem solving for organic dairies in southern climates.
- Development of professional Veterinary Workshops on alternative treatments for organic dairy herds.



**Beef**

1. Organic management systems to produce high quality beef – grade, tenderness, flavor, etc.
2. Organic Best Management Practices (OBMPs) for least-toxic parasite management for beef.
3. E. coli H7-0157 comparisons between organic and non-organic beef.
4. Effects of various dry aging techniques on the quality, taste, nutritional value, and marketability of organic beef.
5. Efficacy of homeopathy for treatment of eye problems and hoof ailments.
6. OBMPs for least-toxic fly control for beef.

**Comments:**

- Breed and line selection for organic beef operations - which breeds perform best in organic systems.
- Evaluation of grass-fed vs modest grain supplementation in organic beef – impact on health & quality of meat.
- E. coli H7-0157 prevention between organic grass-fed only and combination of grass fed/corn fed.
- Organic meat processing--how to simultaneously satisfy USDA meat inspectors and be compliant with NOP standards.
- Research into pasture species mixtures and management practices that achieve year round grazing of beef animals.
- Feeding kelp as pinkeye control.
- Energy use in conventional vs. free range feeding of beef.
- Study for CLA, omega-3 fatty acids in pastured organic beef.
- Research on conventional vs. organic carcasses to analyze chemical and antibiotic residues.
- Analysis and development of markets for organic beef.



**Hogs**

1. Efficacy of natural parasiticides, including tobacco, diatomaceous earth, pumpkin seeds, and various herbs.
2. Herbal remedies for control and/or treatment of scours.
3. Hoop house designs with outside access for hog production.
4. Herbal remedies for control and/or treatment of respiratory diseases.

**Comments:**

- Breed selection for organic hog operations - which breeds perform the best in organic systems in terms of foraging, health, reproduction, profitability, and meat quality.
- Best management practices and feed conversion ratios for pastured hog operations.
- Study management practices on the most successful existing organic hog farms.
- Management systems that allow hogs to express their natural behavior.
- Organic remedies for mange.
- Worm control in pigs is critical.
- Value of fresh water and quality feed in herd health.
- Annual or seasonal production to clean up herd diseases.
- Cost effective swine housing alternatives with natural ventilation and odor management.
- Mobile/alternative housing designs with outside access for organic hog production (w/ rotational grazing).
- Cold weather farrowing strategies.
- Effects of alternative diets on pork quality, especially taste.
- Compare quality of meat between hoop house raised and factory raised pork.



## Sheep and Goats

1. Efficacy of natural parasiticides, including tobacco, diatomaceous earth, pumpkin seeds, and various herbs.
2. Analysis of productivity and profitability comparing meat breeds of goats and sheep to milk breeds.
3. Alternatives to tail docking of sheep.

### Comments:

- Management strategies and approved parasiticides for sheep and goats.
- Analysis of multi-species grazing, combining sheep/goats with cattle.
- Optimal housing and grazing patterns for organic lamb production.
- Pasturing systems which reduce internal parasites, e.g. following sheep with chickens or geese.
- Pasture forbs as anthelmintics.
- Control of caseous lymph and CAE in goats.
- Johne's Disease control in dairy sheep.
- Milk replacers composed of organic ingredients and approved materials.
- Study for CLA and omega-3 fatty acids in organic sheep and goat products.
- OBMPs for different climates.
- Breeds most suited to organic and grass based production.
- Cost effective sheep and goat housing alternatives with natural ventilation.
- Research needs for hand spinning wool breeds.
- Organic fiber - production, profitability, and clarity of standards.
- Materials needed for wool processing, including natural additives to degrade fiber.



## Bees

1. Organic Best Management Practices for prevention and control of diseases and parasites of honey bees.
2. Research to determine how long pesticide and antibiotic residues remain in wax, propolis, honey, brood food, hive bodies, etc.
3. Housing and living conditions best suited for organic honey production.
4. OBMPs for the conversion of conventional bee colonies to organic production.
5. Research the effects on the bee colony of various combustion materials used for smoking hives.

### Comments:

- OBMPs for varroa mite and fungus control.
- Effects of GMO's on bees.
- Research on the use of formic and oxalic acids to control mites.
- Research foraging distance of bees in various environments.
- Forage behaviors as they affect organic compliance.
- Planting of various bee forages as part of a holistic soil building plan on farm.
- Research the best flowering plant types to plant in/along fields for prolonged nectar and pollen production.
- Effective wintering techniques for northern climates.
- Use of swarming to manage the health of bee colonies.
- Herbal parasiticides.
- Compare the performance of drones and queens reared using conventional chemotherapies with those reared organically.
- Compare hive production/health and residues in organic/non-organic locations.
- Test honey/other hive products produced in urban/rural areas for lead or other contaminants.



## Economics

1. Analysis of distribution channels used for organic livestock products and recommendations for improved processing, handling, and distribution systems.
2. Livestock record keeping systems for sound management, profitability, and organic certification compliance.
3. Comparison of investments needed, rate of return, and profitability of organic and non-organic livestock systems.
4. Study impacts of organic livestock operations on local and regional economic development.
5. Market survey of supply and demand for organic meat products in the Upper Midwest.
6. Economic analysis of organic dairy, beef, lamb, pork, egg, broiler, and turkey production systems in the Upper Midwest.

### Comments:

- Investigate methods/develop courses for farmer/business instruction on how to implement a network of small scale slaughter/processing facilities and associations.
- Study use of cooperatives as a cost sharing vehicle for meat and dairy product production and marketing.
- Establishing, maintaining, and/or working with existing alternative marketing models, (i.e. Community Supported Agriculture, local food initiatives) to market organic livestock products.
- Economic analysis of value-added meat enterprises.
- Slaughter and processing facilities--economic analysis and legal feasibility of different options.
- Laws, regulation and policies for small scale processing.
- Analyze cost/benefit for livestock producers and processors to go through certification.
- Market potential and the bottom line economics!
- Information needed to promote transition to organic (i.e. economic data, OBMPs).
- Consumer education - the impacts of consumer choices on the rural landscape.
- Determine and promote organic characteristics that support/sustain small farms and rural communities.
- Financial benefits to micro/small farmers of incorporating livestock/dairy/eggs into crop mix.
- Economic analysis for disabled farmers and ranchers.
- Location of organic farms in close relationship to urban housing to improve urban/rural contacts.
- Economic research on raising on-farm feed for cattle.
- Cost comparisons of organic and non-organic livestock inputs and products.
- How to allow organic production to mimic conventional distribution channels.



This survey was conducted as part of Jim Riddle's tenure in the Endowed Chair in Agricultural Systems at the University of Minnesota. Jim would like to acknowledge the assistance of Jane Jewett, Kate Seager and Nikki Harper in conducting the survey, tabulating and analyzing the results; Joyce Ford in the development of the survey; and Beth Nelson and Daniel Ungier for design and layout.

Over the past 22 years, James A. Riddle has been an organic farmer, inspector, educator, policy analyst, author, and consumer. He was founding chair of the Independent Organic Inspectors Association, (IOIA), and co-author of the IFOAM/IOIA International Organic Inspection Manual. He has trained hundreds of organic inspectors worldwide. Jim serves on the Minnesota Department of Agriculture's Organic Advisory Task Force, and was instrumental in passage of Minnesota's landmark organic certification cost-share program. Jim currently serves on the National Organic Standards Board, which advises the USDA on organic agriculture policies and regulations, and holds the position of Endowed Chair in Agricultural Systems at the University of Minnesota.

## Appendix: Data Table for Organic Livestock Survey Results

The following table includes all survey questions, including complete information on rankings and statistical analysis.

Key	
Resp.	= number of responses for a topic, out of 203 returned surveys.
Mean	= total of all scores, divided by number of scores
Median	= middle score in an ordered list
Mode	= most frequent score
Variance	= $\sum [(score - mean)^2] / (number\ of\ scores - 1)$
Index	= $(mean + median + mode) * (\#\ responses / 203)$

General	Resp.	Mean	Median	Mode	Index	variance
Analyze the nutritional and health value of organically produced livestock products, especially pasture raised or grass fed livestock	181	3.8	4	5	11.4	1.5
Explore impacts of “systems” approach (rotational grazing, multi-species grazing, etc.) on internal and external parasite loads for various species.	183	3.6	4	5	11.4	1.4
Organic methods of building soil fertility to optimize livestock health and thereby reduce or eliminate the need for medications, vaccines, parasiticides, and supplemental vitamins and minerals.	179	3.8	4	5	11.3	1.7
Organic Best Management Practices for least-toxic parasite management for various species.	181	3.6	4	5	11.2	1.7
Analyze how livestock production impacts the entire diversified organic farm, including impacts on fertility management; weed, pest, and disease pressure; utilization of resources; water quality; farm labor; and profitability.	183	3.4	4	4	10.3	1.8
Breeds of various species best suited to organic production – feed utilization, grazing response, disease and parasite resistance, ease of reproduction, and minimization of stress.	184	3.3	3	5	10.2	1.8
Nutritional value of weeds, how they can best be utilized in livestock diets, and threshold levels for inclusion in livestock rations.	182	3.4	3	5	10.2	1.8
Comparison of grain-based organic livestock systems with grass-based organic systems.	182	3.4	3	5	10.2	1.8
Organic Best Management Practices for least-toxic fly control. Examine holistic strategies, including: 1) augmentation or introduction of predators or parasites; 2) development of habitat for natural enemies; 3) non-synthetic controls such as lures, traps, and repellents; 4) manure management systems; 5) pasture rotation; 6) use of clean, dry bedding; and 7) impact of moisture control.	180	3.5	4	4	10.2	1.5
Develop Organic Best Management Practices checklist to help producers evaluate all aspects of the farm and then create action plans for successful conversion.	185	3.2	3	3	8.4	1.7
Approved weed control strategies for pasture and forage management, especially for noxious weeds such as Canada thistle.	181	3.4	3	3	8.4	1.6
Analysis of successful conversion strategies to develop Organic Best Management Practices for the conversion of various types of livestock operations to organic production.	182	3.1	3	3	8.2	1.6
Investigate anecdotal reports of improved livestock health with organic management – review of on-farm case studies.	180	3.1	3	3	8.1	1.5
Utilization of alternative grains to corn and soybeans which fit into organic crop rotation systems.	180	2.9	3	3	7.9	1.4
Other – respondents’ suggested topics	28	4.4	5	5		1.8

Livestock Health Care	Resp.	Mean	Median	Mode	Index	variance
Catalog animal health problems for various species, listing approved health care options and allowed medications.	183	3.8	4	5	11.5	1.5
Examine naturally occurring sources of vitamins and minerals within organic feed compared to use of supplementation materials.	180	3.6	4	5	11.2	1.4
Organic Best Management Practices for the prevention of various diseases in various livestock species and breeds.	181	3.4	4	4	10.2	1.4
Efficacy studies, conducted under certified organic conditions, of approved health care practices and allowed medications for various species and age groups, including calf-hood medications.	178	3.4	4	4	10.0	1.5
Efficacy of vaccines used in organic systems.	180	3.2	3	4	9.0	1.8
Review of non-approved medications against criteria for organic use to determine compatible products and/or formulations not currently approved.	177	3.2	3	4	8.9	1.7
Efficacy trials of approved mineral and vitamin supplements for various species.	178	3.3	3	3	8.2	1.6
Inventory of non-genetically engineered and genetically engineered vaccines.	179	3.1	3	3	8.0	1.9
Water quality and livestock health – impacts of nitrate, coliform, and/or pesticide residues on various species.	179	3	3	3	7.9	1.6
Physical alterations for various species which promote animal welfare while minimizing pain and stress, including the branding and dehorning of breeding, slaughter, and dairy animals.	174	2.5	2	1	4.7	1.9
Other – respondents’ suggested topics	18	4.8	5	5		0.3

Housing and Living Conditions	Resp.	Mean	Median	Mode	Index	variance
Manure management systems which do not contaminate crops, soil, or water with plant nutrients, heavy metals, or pathogenic organisms and which optimize recycling of nutrients.	177	3.5	4	5	10.9	2
Winter housing designs which provide outdoor access while maximizing the health and productivity of animals.	179	3.3	3	4	9.1	1.8
Role of facility sanitation in promoting livestock health.	176	3	3	4	8.7	1.7
Outdoor and indoor living conditions and stocking rates for various species which accommodate health and natural behavior.	182	3.2	3	3	8.2	1.7
Research housing designs which promote health, minimize stress, and maximize production for various species in various regions.	179	3.2	3	3	8.1	1.9
Air quality impact on livestock health – various species.	175	2.7	3	3	7.5	1.7
Alternatives to lumber treated with copper chromium arsenate or other prohibited materials for fence posts and building materials.	176	2.8	3	1	5.9	2
Review costs and benefits associated with temporary confinement of various species and production systems.	175	2.5	2	1	4.7	1.6
Other – respondents’ suggested topics	12	4	4.5	5		1.8



## ORGANIC LIVESTOCK RESEARCH SURVEY

<b>Poultry</b>	Resp.	Mean	Median	Mode	Index	variance
Review of poultry breeds that are best adapted for outdoor access.	147	3.5	4	5	9.1	1.7
Investigate impact of outdoor access on disease exposure and incidence in organic flocks.	147	3.4	4	5	9.0	1.8
Meeting the nutritional needs of poultry within the restrictions of the organic standards, i.e. feed rations with no synthetic methionine.	150	3.6	4	4	8.6	1.4
Organic Best Management Practices for poultry outdoor access - investigation of system designs that meet organic requirements.	149	3.5	4	4	8.4	1.5
Efficacy of various rations using organic feed ingredients and approved feed supplements for broilers, layers, and turkeys.	147	3.5	4	4	8.3	1.6
Amino acid concentrates for poultry derived from organic agricultural products.	147	3.1	3	3	6.6	1.8
Alternatives to beak trimming of laying hens – breed selection, housing, stocking rate, gender mix, breed combinations, ration, diversions, and activities.	145	3	3	3	6.4	1.8
Organic hatchery management – systems design and operation.	144	3	3	3	6.4	1.8
Other – respondents' suggested topics	15	4.8	5	5		0.2

<b>Dairy</b>	Resp.	Mean	Median	Mode	Index	variance
Organic Best Management Practices (OBMPs) for prevention and treatment of mastitis.	161	4.1	5	5	11.2	1.3
OBMPs for least-toxic fly control for dairy.	159	3.7	4	5	9.9	1.5
Compile and analyze existing research results on organic rotational grazing.	162	3.6	4	4	9.3	1.5
OBMPs for least-toxic parasite management for dairy cattle, including calves.	158	3.8	4	4	9.2	1.4
OBMPs for calf management and system designs which maximize health and productivity and allow for expression of natural behavior.	160	3.3	3	3	7.3	1.8
Evaluation of seasonal dairying - analysis of impacts on land, costs, and how this could fit into a diversified organic farming operation.	161	3.2	3	3	7.3	1.8
Evaluation of teat dip formulations for efficacy and compliance with organic regulations.	158	3.2	3	3	7.2	1.6
Milk replacers composed of organic ingredients and approved materials.	156	2.8	3	1	5.2	1.9
Other – respondents' suggested topics	18	4.5	5	5		1.1

<b>Beef</b>	Resp.	Mean	Median	Mode	Index	variance
Organic management systems to produce high quality beef – grade, tenderness, flavor, etc.	160	3.8	4	5	10.1	1.5
Organic Best Management Practices for least-toxic parasite management for beef.	156	3.7	4	5	9.8	1.4
E. coli H7-0157 comparisons between organic and non-organic beef.	155	3.6	4	5	9.6	1.8
Effects of various dry aging techniques on the quality, taste, nutritional value, and marketability of organic beef.	153	3.5	4	4	8.7	1.6
Efficacy of homeopathy for treatment of eye problems and hoof ailments.	158	3.4	4	3	8.1	1.6
Organic Best Management Practices for least-toxic fly control for beef.	158	3.5	3.5	3	7.8	1.3
Other – respondents' suggested topics	14	4.7	5	5		0.4

<b>Hogs</b>	Resp.	Mean	Median	Mode	Index	variance
Efficacy of natural parasiticides, including tobacco, diatomaceous earth, pumpkin seeds, and misc herbs.	132	3.9	4	5	8.4	1.5
Herbal remedies for control and/or treatment of scours.	134	3.4	4	5	8.2	1.8
Hoop house designs with outside access for organic hog production.	136	3.3	3	5	7.6	1.9
Herbal remedies for control and/or treatment of respiratory diseases.	134	3.3	3	5	7.5	1.8
Other – respondents' suggested topics	15	4.5	5	5		1.3

<b>Sheep and Goats</b>	Resp.	Mean	Median	Mode	Index	variance
Efficacy of natural parasiticides, including tobacco, diatomaceous earth, pumpkin seeds, and misc herbs.	137	3.9	4	5	8.7	1.7
Analysis of productivity and profitability comparing meat breeds of goats and sheep to milk breeds.	139	3.1	3	3	6.2	1.7
Alternatives to tail docking of sheep.	132	2.7	3	1	4.4	1.9
Other – respondents' suggested topics	15	4.5	5	5		1.6

<b>Bees</b>	Resp.	Mean	Median	Mode	Index	variance
Organic Best Management Practices for prevention and control of diseases and parasites of honey bees.	123	3.8	4	5	7.8	1.9
Research to determine how long pesticide and antibiotic residues remain in wax, propylis, honey, brood food, hive bodies, etc.	124	3.4	3	5	7.0	1.8
Housing and living conditions best suited for organic honey production.	123	3.3	4	4	6.8	1.7
Organic Best Management Practices for the conversion of conventional bee colonies to organic production.	122	3.3	3.5	4	6.5	1.5
Research the effects on the bee colony of various combustion materials used for smoking hives.	122	2.8	3	3	5.3	1.5
Other – respondents' suggested topics	20	3.9	4	5		2.5

<b>Economics</b>	Resp.	Mean	Median	Mode	Index	variance
Analysis of distribution channels used for organic livestock products and recommendations for improved processing, handling, and distribution systems.	175	3.8	4	5	11.0	1.6
Livestock record keeping systems for sound management, profitability, and organic certification compliance.	177	3.5	4	5	10.9	1.9
Comparison of investments needed, rate of return, and profitability of organic/nonorganic livestock systems.	175	3.5	4	5	10.8	1.7
Study impacts of organic livestock operations on local and regional economic development.	169	3.5	4	5	10.4	1.7
Market survey of supply and demand for organic meat products in the Upper Midwest.	168	3.4	4	5	10.3	2
Economic analysis of organic dairy, beef, lamb, pork, egg, broiler, and turkey production systems in the Upper Midwest.	168	3.1	3	5	9.2	2.1
Other – respondents' suggested topics	18	4.7	5	5		0.9