

ANIMAL HUSBANDRY

DESCRIPTION

The terms animal husbandry and animal welfare are often interchangeable. Animal welfare is defined by the American Veterinary Medical Association as the “human responsibility that encompasses all aspects of animal well-being, including proper housing, management, nutrition, disease prevention and treatment, responsible care, humane handling, slaughter and, when necessary, humane euthanasia.”¹ Cows are most productive when their needs are provided for in optimal ways. Cows thrive with comfort and consistency. While dairy farmers inherently know that animal welfare should be a top concern, significant pressure to increase profits may encroach on this consideration as a trade-off for short-term gain. To be successful in the long term, a farmer must provide for appropriate animal health, as “any animal will perform well below potential wherever under nutrition or stress is present.”²

In most cases a farmer only makes a decision that decreases animal well-being under one of two conditions: he/she doesn't have time to do the right thing for the animal or he/she lacks the resources (financial or physical) to improve the situation. This may present a bit of a catch 22 since the farmer needs to build up resources to make structural changes. On the way to building a better-designed facility, the cows are going to be overcrowded in the current facility.

Three main areas should be reviewed in order to ensure optimal performance: nutrition, living conditions, and overall health. Animal nutrition refers to the type and quality of feed that are provided to the dairy cows. They should receive a well-balanced portion of grain to ensure enough energy for milk production and fiber to ensure proper digestion.³ An imbalance will result in poor milk production and/or health concerns. Living conditions refer to the general comfort of the animal. This includes the quality, size, and cleanliness of the living and milking space. The frequency in incidence of diseases, such as mastitis, lameness, infertility, and certain metabolic disorders can be used as a way to assess impacts on herd health. Nutritional intake and living conditions are important determinants of herd health.

Optimal well-being manifests as good health and high productivity. The ration fed certainly plays a role in maintenance of health and well-being. Sufficient fiber is required to maintain the health of the rumen. Fiber that is more digestible can be consumed in greater quantities and support higher levels of milk production. The protein and non-protein nitrogen sources must be balanced to match the digestibility of the carbohydrates in the ration. Acidosis, ketosis, milk fever and other metabolic disorders are usually related to dietary formulation. Mastitis may reflect overall immune status but is usually related to cleanliness of stall bedding and sometimes to milking routine. Heat stress can contribute to depression of immune function and an increase in mastitis, reduction in feed intake and consequent reduction in milk production and potentially a higher incidence of metabolic disease, and also lower fertility. Retained placenta and infertility may also have nutritional causes. Incidences of lameness and displaced abomasums are among the best indicators of herd nutritional health. Lameness may have infectious causes and foot bath management is critical to controlling this problem in many herds.



INCENTIVES FOR CHANGE

- **Net Profit.** When pressured to increase cash flow, farmers tend to focus on increasing volume rather than on decreasing operating costs. By increasing milk volumes through unnatural means such as adding growth hormones to increase production (rbST), unbalanced feed, encouraging higher consumption, etc., animal welfare may suffer and cost as much or more than the increase in profits due to associated production costs, health treatment costs and management demands.⁴ “Heating up” a ration is usually a bad idea. Using rbST without providing additional feed can cause problems. Feeding a more digestible, balanced ration is always more beneficial when addressing milk production levels. For example, as milk yields increase, diseases, such as lameness, mastitis or fertility problems, also increase.⁵ The greater the work demands on the cow, the more susceptible they are to disease and stress. Proper nutrition and living conditions can stave off disease, via prevention. The focus needs to be on removing road blocks to optimal performance. Do the cows have ready access to adequate and clean water? Do the cows have ready access to adequate well-balanced feed? Do the cows have clean, comfortable stalls to rest in. Given the high costs associated with disease, such as vet costs, and lost revenues due to decreased milk production, farmers should investigate ways to prevent disease or other detriments to herd health. It is important to balance and understand the connection between high production and the maintenance of herd health.
- **Improved public image.** Farmers are unfortunately under critical review by the public that may not truly understand the actual needs of the animals. Due to the increasing threat of unwanted attention from animal activist groups, a number of organizations are taking independent steps to ensure animal health such as Temple Grandin's efforts to improve animal welfare in slaughterhouses-including those where old dairy cows go. Another example comes from Heifer International. This non-profit group provides a heifer, or other animals, to a family that is struggling to make ends meet. They recently developed guidelines regarding animal welfare practices for their receiving families. Similarly, the farmer that proactively modifies his or her practices potentially improves animal health, on their farm.

ASSESSMENT QUESTIONS

For all questions, please choose the categories that best identify your current management practices. Use the summary sheet on the last page of this module to evaluate overall performance.



HERD NUTRITION ⁶

- 1. Herd nutrition is inadequate or not monitored.
- 2. Farmer works with supplier or farm advisor that has nutritional expertise and determines appropriate balance for cows.
- 3. In addition to #2, farmer understands connection between metabolic diseases (such as ketosis, retained placenta, infertility, etc.) and nutritional needs. Records are routinely kept regarding feed rations, their nutritional value, their relation to milk production and herd health issues.
- 4. In addition to #3, rations are regularly modified through signs of efficient digestion. Well-balanced rations are identified and changed periodically.

The level of understanding and monitoring involved in herd nutrition is important because it has significant implications for milk production and herd health.⁷ By keeping records regarding changes in diet, patterns may emerge that will help to identify best nutrients for a specific herd. The closer the farmer and/or nutritionist can get to meet each cow's exact needs, the more sustainable the process will be.

OVERALL HEALTH ⁸

- 1. Herd health is inadequate.
- 2. Herd health is recorded for each cow, by milk production, body condition, diseases, foot and leg problems, vaccinations and medications. Veterinarians make monthly visits to inspect animals and sick animals are given appropriate medications and antibiotics.
- 3. In addition to #2, herd health is visually checked daily. Sick cows are housed and milked separately from the herd, or after the rest of the herd in the same parlor, or milking area.
- 4. In addition to #3, the farmer focus is to determine causes of sub-optimal health issues and implement preventative measures, with help from specialists, like veterinarians.

Understanding and monitoring herd health is critical to understand the condition of your cows. In order to ensure each cow is in optimal health and the quality of the milk, it is important to analyze and track cows individually. Similarly, it is important to separate sick cows from the rest of the group to minimize the spread of disease. Taking preventative measures is a best practice as problems are corrected before they start.

HEALTH OF INCOMING/OUTGOING ANIMALS ⁹

- 1. Incoming animals (including bulls) without known health histories are brought directly onto farm.
- 2. Incoming animals are from herds with known health status and effective vaccination programs.
- 3. In addition to #2, incoming animals are carefully examined for health concerns and are thoroughly washed before bringing them onto the farm. And quarantined for observation. Visitors wear booties or clean their boots prior to entering the barn.
- 4. In addition to #3, animal delivery to renderers and cattle dealers is done outside of barns, without contact between these individuals and other animals. Additional bio-security measures, such as farm signage instructing visitors how to proceed onto the farm, are taken.

Just as there is concern regarding the spread of disease within the farm, steps should also be taken to decrease the chance of spreading disease among farms. A few simple precautions regarding animal transportation and integration of new animals to the herd can minimize the potential risk of spreading diseases.



MILK QUALITY

- 1. While milk quality, as measured by somatic cell count (SCC), is reported, there is no time to review this information.
- 2. Milk quality is periodically monitored through SCC. Farmer understands milk quality and health implications of high SCC, and monthly average is less than 350,000.
- 3. SCC counts are monitored regularly, and farmer has acceptable target range of SCC. Average monthly SCC is less than 250,000.
- 4. In addition to #3, the average monthly SCC is less than 150,000.

The farmer has more data at his/her disposal than just SCC (at least from most handlers). Raw, pre-incubation, and pasteurized counts can help pinpoint the source of trouble when total SCC is elevated. An economic consideration via price premiums is determined in part by SCC, as set by the farmer's Co-op. Somatic Cell Count (SCC) indicates infection and possibility of the presence of mastitis, which usually decreases milk production and may be contagious. In terms of managing mastitis, early identification is best to prevent spreading, and various management practices can reduce the likelihood of this infection. For example, some farmers have seen a decrease in mastitis incidence when they increase the amount of time their cows are outside on pasture. This pasturing assumes optimal outdoor conditions, such as well-drained pastures to minimize mud. This helps to deal effectively with environmental pathogens that cause mastitis. However, pastures in poor conditions have been associated with higher levels of infection with a type of environmental mastitis. Another cause of mastitis, contagious pathogens, can be decreased by correctly managing milking procedures.¹⁰ Culture monitoring and sensitivity testing can be used to choose treatments appropriately. Milking management alone is often not enough to eliminate many contagious organisms.¹⁰

LACTATION MANAGEMENT/CULL RATES ¹¹

Dairies should endeavor to milk each cow until she has reached her maximum production in 3rd or 4th lactation. An excellent heifer rearing program will naturally reduce the overall age of the herd unless the farmer markets heifers.

- 1. Farmer does not monitor the number of lactations per cow, and is unaware of his herd replacement rates.
- 2. Farmer monitors number of lactations and milk production. Cull rate averages greater than 35%.
- 3. Farmer monitors number of lactations per cow and herd average cull rate is 25 % to 35% per year.
- 4. Farmer monitors number of lactations per cow and herd average cull rate is less than 20%.

"Most modern dairy cows have a life span of less than four lactations."¹² Cows that are stressed or treated only to optimize milk production typically have a shorter productive life span. A farm that consistently strives to produce more milk may have higher operating costs related to more frequent heifer replacement, or losing cows to preventable causes.

HOUSING/HANDLING AREAS ¹³

- 1. Housing and handling areas are inadequate, causing undue stress. Walking areas are poor quality, either wet and slippery or too rough. Water stations are limited, and cattle are confined to limited movement.
- 2. Housing and handling areas are maintained in clean and dry conditions with adequate clean bedding, feeders and water stations.
- 3. In addition to #2, housing and handling areas are large enough to allow normal interactions and social behaviors and to minimize cow stress.
- 4. In addition to #3, new or renovated housing/handling areas implement advanced design features to minimize stress by aligning cow movement patterns to match a cow's own natural tendency.

Stress levels of a cow can not only impact productivity and depressed social behavior, but also overall health. Housing features significantly impact stress levels. The types of flooring in walking and standing areas, as well as the amount of time standing on concrete, also have large impacts on the incidence of lameness. Additionally, clean, dry bedding is critical to prevent mastitis.



STALLS

- 1. Stalls are inadequate, tight and do not allow sufficient room for relaxing, causing undue stress.
- 2. Stall dimensions are large enough for cows to lie comfortably, including sufficient width, headroom and clean bedding.
- 3. In addition to #2, cows use stalls as designers intended. Each stall has a slight slope to the stall, dry and regularly cleaned bedding, appropriate lighting or sufficient ventilation.
- 4. In addition to #3, there is 5% more stall space in the barn than there are cattle, enabling normal social behaviors and minimizing cattle stress. There are open, exercise areas for cows with enough space for cows to lie comfortably.

Cows, especially in confinement operations, spend a significant amount of time in their stalls. Ensuring that the cow can maneuver around comfortably is critical to its health. If a stall is not designed properly, the cow may be forced to behave in non-natural ways (such as standing for long time periods). Sometimes the physical design of the stall is sufficient; however, social relations among cows may disrupt optimal behavior. For example, it is not uncommon to see lower social standing cows forced to stand for long periods of time, mainly because the only place to lie down is close to a dominant cow. This, too, results in an increase in health problems and a decrease in milk production. By providing additional stalls, the farmer allows a comfortable place for these lower social standing cows. Sufficient space provides an advantage for separating first lactation cows from older cows, and reduces competition in pre-fresh cow group.

PASTURING ¹⁴ (If cows are not pastured, mark “1” in the summary sheet.)

Pasture is a management decision and to work well must be managed well. Not all farms choose to emphasize pastures. This section refers to dry cows, heifers and milking cows.

- 1. Pastures if available, are openly-grazed, undivided and primarily used as exercise areas.
- 2. Pastures have adequate forage for all groups of pasturing cows. If cows are wintered outside, conditions are carefully monitored and provisions are made to ensure adequate food, water, bedding and shelter during severe weather; shelter and teat care are adequate to prevent frostbite; sufficient extra feed is provided to maintain body condition; cows are clean and dry when turned out after milking; and manure from wintered cattle is not allowed to contaminate surface water.
- 3. In addition to #2, multiple paddock divisions are maintained and cows are moved at least daily. Rotations are scheduled to maintain adequate re-growth.
- 4. In addition to #3, forage species are managed for maximum, vegetative production. Fields are allowed sufficient rest and regrowth periods between grazings. Supplemental feed, water and shelter sites within paddocks are also rotated to prevent erosion and reduce compaction in these areas.

While mixed opinions exist regarding herd health benefits of pasturing, this topic was included for completeness as optimal pasturing conditions lead to improved herd health. The greatest benefit is often in hoof health. Pasturing cows allows them the freedom to exercise and live in a more natural environment. Again, as with confinement, certain provisions must be considered for this method to be optimally beneficial for both the cows and the land.



MILKING EQUIPMENT AND PARLOR ¹⁵

- 1. Milking equipment and facilities are often in need or repair or breakdown.
- 2. Milking equipment and facilities are adequate and in good working order. Milking system and coolers are monitored and cleaned routinely.
- 3. Milking equipment is tested for proper function. Facilities are designed and maintained for animal comfort. Milking area is clean and well ventilated. Bacteria results are tested, documented, and monitored on a monthly basis.
- 4. In addition to #3, equipment is thoroughly cleaned and maintained as part of the regular weekly routine and monitoring results have been maintained at acceptable level.

Given that cows are typically milked twice a day, it is critical to the comfort of the animal that the milk equipment is functioning properly. The milking facility is also an area where contagious diseases can be spread. By increasing the cleanliness and ventilation in these areas, the likelihood of spreading diseases is decreased.

CALF RAISING CONDITIONS (Check all that apply. Calves farmer-raised or custom raised. For scoring, add 1 for each box checked.)

- Calves consume colostrum within 2 hours of birth. The calf cannot absorb immunoglobulin after 24 hours.
- Calves are fed concentrate to develop their rumen.
- Sufficient space is provided for calves to lie comfortably and as needed.
- Calves are provided clean, dry, and well-ventilated housing.
- Calves' navels umbilicus are dipped in tincture of iodine.

Special attention is required early in the life of a cow in order to ensure an optimally healthy life. The calf cannot absorb immunoglobulin after 24 hours, it must get adequate volumes as soon as possible. The best practice is to feed colostrum within 2 hours of birth to have a high level of passive transfer of immunoglobulin. Colostrum quality should be monitored as well.

Just as with mature cows, nutrition and living conditions must be considered in overall calf health. For calves, nutritional concerns revolve around consuming colostrum shortly after birth and roughage within the first two weeks. Living conditions for calves should be clean, dry and well ventilated with sufficient room for movement and to lie comfortably. Just as for older cows, living conditions can help to discourage (or encourage if not appropriate) disease incidence. One final practice to ensure optimal health for the calf is dipping the umbilical cord in iodine. The umbilical cord is a hollow tube and if not treated properly, pathogens which cause disease can enter the calf's circulatory system. This can result in mortality or naval infection. Iodine serves to clean, sanitize and dry the end of the umbilical cord, which in turn closes the tube quicker, thereby decreasing the chance of pathogens entering the calf's system.¹⁶

LINKAGES TO OTHER MODULES

While the questions above cover the basics of animal husbandry, other practices also have impacts. Please review your practices regarding the following topics in the Educational Modules listed below.

ANIMAL HUSBANDRY TOPIC

Manure Management
Clean Water
Potential Erosion
Cooling

OTHER MODULE(S)

Nutrient Management
Water Management
Soil Health
Energy



FURTHER INFORMATION

Additional details and information on the above can be obtained through the following programs.

- **Appropriate Technology Transfer for Rural Areas (ATTRA).** “Sustainable Agriculture: An Introduction.” <http://attra.ncat.org>. ATTRA specializes in developing sustainable agricultural information and tools. For a summary of the practices they advocate regarding animal welfare, see “Sustainable Agriculture: An Introduction” at <http://attra.ncat.org/attra-pub/PDF/sustagintro.pdf>. Contact: Ann Wells, phone: 1-800-346-9140.
- **University of Vermont Extension Dairy Specialist.** Department of Animal Science, 113 Terrill Hall, 570 Main Street, Burlington, VT 05405 Phone: 802-656-4496 www.uvm.edu/extension.
- **On Farm Assessment and Environmental Review (OFAER) program.** <http://www.acwf.org/docs/forma.pdf>
- **The Food Alliance.** <http://www.thefoodalliance.org/>. This organization certifies producers, which use socially and environmentally responsible farming practices. The certification process includes sections on natural area management, watershed management, crop management, pest management, pastureland management, and animal husbandry.
- **Farm Animal Welfare Council (FAWC).** This organization was established by the United Kingdom government but is an independent advisory board that is active in reviewing the welfare of farm animals. They produced a report, “Report on the Welfare of Dairy Cattle by Farm Animal Welfare Council,” which identifies a number of concerns and solutions regarding dairy cattle. <http://www.fawc.org.uk/reports/dairycow/dcowrtoc.htm>.
- **Facility Designs that Minimize Stress.** Dr. Temple Grandin, as Associate Professor of Animal Science at Colorado State University, has conducted research regarding the design of cow facilities and how to minimize stress on the animal. Specific topics and links with additional information are:
 - Non-slip flooring: <http://www.grandin.com/design/non.slip.flooring.html>
 - Livestock handling systems: <http://www.grandin.com/design/design.html>
 - Handling and transport: <http://www.grandin.com/behaviour/transport.html>
- **Cooperative Extension, Institute of Agriculture and Natural Resources, University of Nebraska - Lincoln.** www.ianr.unl.edu/pubs/animaldisease/g1032.htm#nutritionally. This website, titled “Dairy Cow Health and Metabolic Disease Relative to Nutritional Factors,” contains information provided by a veterinarian and dairy specialist.



OTHER LINKS:

- **Certified Human Raised and Handled**
www.certifiedhumane.com
Parameters were developed with organic production in mind.
- **DQA self evaluation (Milk and Dairy Beef Quality Assurance Program)**
<http://www.dqacenter.org/dcare/dcare00.htm>
[Caring for Dairy Animals Technical Reference Guide](#) and
[On-The-Dairy Self-Evaluation Guide](#)
- **CA Dairy Quality Assurance Program**
<http://www.cdqa.org/ahw/>
Assessment used as marketing tool.
- **Validus (formerly Environmental Management Solutions)**
AWARE program scores 10 areas (Animal Welfare Assurance Review and Evaluation).
<http://www.emsllc.org/aware04/awaredefaultpage04.asp>
see <http://www.mvma.org/Proceedings/bovine/Issues%20in%20Food.html>
- **NCCR/FMI - Animal Welfare Audit Program (AWAP)**
SES, Inc. (SES) has been contracted by the National Council of Chain Restaurants and the Food Marketing Institute to develop a voluntary animal welfare audit program for their members.
www.ses-corp.com
<http://www.awaudit.org/DesktopDefault.aspx?tabindex=0&tabid=1>
- **FACTA Farm Animal Care Training and Auditing**
www.factallc.com/
Provides auditing services for livestock.
- **Ontario Ministry of Agriculture, Food and Rural Affairs**
<http://www.gov.on.ca/OMAFRA/english/>.
Excellent reference for stall design.



SUMMARY OF RESULTS FOR ANIMAL HUSBANDRY

Instructions: In the table below, please record the score for the answer you selected for each question. For multiple-choice questions, the response number serves as your score for that category (i.e. choice # 2 is worth 2 points). For “check all that applies questions,” please see scoring criteria for each question in the chart below. Once all responses have been completed, add up the answers and record the total.

QUESTION	ANSWER/SCORE
1. Herd Nutrition	
2. Overall Health	
3. Health of Incoming/Outgoing Animals	
4. Milk Quality	
5. Lactation Management	
6. Housing/Handling Areas	
7. Stalls	
8. Pasturing	
9. Milking Equipment	
10. Calf Raising Conditions (Add 1 for each box checked)	
Total Score (Out of Possible 41)	

Interpretation: The next step in understanding your farm's performance in the category of Animal Husbandry is to compare your results to best practices. Below is a table that ranks your performance from best practices (green) to practices that require improvement (red). Compare the number of points you received for your farm compared to optimal practices.

	Point Range	Interpretation
Green	35 - 41	Best practices regarding Animal Husbandry are currently being employed on this farm.
Yellow	25 - 34	Farm is using some good practices regarding Animal Husbandry, however there are some key areas that should be improved upon.
Red	9 - 24	Animal husbandry practices should be carefully evaluated and a strong effort should be made to adopt improved practices in several areas.



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Footnotes

- 1 American Veterinary Medical Association Policy on Animal Welfare and Animal Rights. Animal Welfare Guidelines, Heifer International.
- 2 International Livestock Research Institute. <<http://www.cgiar.org/ilri/dbtw-wpd/fulldocs/smh dairy/22egan-02.htm>>. 8 July 2003.
- 3 Wells, Ann. Personal Interview. 30 July 2003.
- 4 "Report on the Welfare of Dairy Cattle by Farm Animal Welfare Council (UK)." Sept. 2003. <<http://www.fawc.org.uk/reports/dairy cow/dcowr079.htm>>. 12 Oct. 2003.
- 5 Broom, Donald M., "Effects of Dairy Cattle Breeding and Production Methods on Animal Welfare." University of Cambridge, Department of Clinical Veterinary Medicine. <<http://www.nal.usda.gov/awic/pubs/dairy/effects.htm>>. 8 July 2003.
- 6 Question adapted from The Food Alliance. Dairy Inspection Tool for the Pacific Northwest. 2002.
- 7 Rice, Duane N. and Grant, Rick. "Dairy Cow Health and Metabolic Disease Relative to Nutritional Factors." Institute of Agriculture and Natural Resources, Cooperative Extension, University of Nebraska-Lincoln. July 1996. <www.ianr.unl.edu/pubs/animaldisease/g1032.htm#nutritionally>. September 2003.
- 8 Question adapted from The Food Alliance. Dairy Inspection Tool for the Pacific Northwest. 2002.
- 9 Ibid.
- 10 Appropriate Technology Transfer for Rural Areas. Dairy Farm Sustainability Check sheet. March 2001. <<http://attra.ncat.org/attra-pub/PDF/dairychecksheet.pdf>>. 10 June 2003.
- 11 Question adapted from The Food Alliance. Dairy Inspection Tool for the Pacific Northwest. 2002.
- 12 "Report on the Welfare of Dairy Cattle by Farm Animal Welfare Council (UK)." Sept. 2003. <<http://www.fawc.org.uk/reports/dairy cow/dcowr079.htm>>. 12 Oct. 2003.
- 13 Question adapted from The Food Alliance. Dairy Inspection Tool for the Pacific Northwest. 2002.
- 14 Ibid.
- 15 Question adapted from The Food Alliance. Dairy Inspection Tool for the Pacific Northwest. 2002.
- 16 Leadley, Sam and Sojda, Pam, "Calving Ease." March 2001. <<http://www.calfnotes.com/pdf/CNCE0301.pdf>>. 1 Dec. 2003.

