The Comments of

Food Animal Concerns Trust

to the National Organic Standards Board

June 12, 2006

Comments submitted by:
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Re: Docket Number: TM-05-14. National Organic program (NOP) – Access to Pasture (Livestock)

Introduction

Food Animal Concerns Trust (FACT) is a non-profit organization founded in 1982 that advocates humane and sustainable farming practices that: improve the safety of milk, meat and eggs; promote the humane husbandry of food animals; reduce environmental pollution and conserve natural resources; and broaden economic opportunities for family farmers, including the development and preservation of niche markets. In January 2005, FACT launched its Dairy Project. In consultation with dairy nutritionists, extension agents, dairy producers and animal behavior scientists, FACT is in the process of working with dairy operations in Texas to implement practices that improve the welfare and comfort of dairy cows. This project is based on an extensive review of over 500 research articles in veterinary medicine and animal science journals. In addition, FACT just completed an additional review of the literature that focused on the relationship between animal health, animal welfare and food safety for pigs, poultry, beef cattle and dairy cows. FACT continues to work with the US Department of Agriculture (USDA) and the Food and Drug Administration (FDA) on food labeling claims for food animal production.

FACT is pleased to have this opportunity to submit comments to the NOSB regarding the important issue of access to pasture for livestock.

Comments - Scope of the ANPR

(1) Is the current role of pasture in the NOP regulations adequate for dairy livestock under principles of organic livestock management and production?

The organic regulations specifically provide for access to pasture for ruminants. The regulations read as follows:

Section 205.239 Livestock living conditions.

> (a) The producer of an organic livestock operation must establish and maintain livestock living conditions which accommodate the health and natural behavior of the animals, including:
>
> (1) Access to the outdoors, shade, shelter, exercise areas, fresh air, and direct sunlight suitable to the species, its state of production, the climate, and the environment."
>
> (2) Access to pasture for ruminants;

Although access to the outdoors is required for all livestock in 205.239(a)(1) the regulations make a specific point of addressing the issue of access to pasture for ruminants in 205.239(a)(2). The intent is clear from the regulation.

To underscore and further clarify the intent of requiring access to pasture for ruminants, the NOSB specifically addressed the issue of intent in their June 7, 2001 Pasture Livestock Committee recommendation.[1] In this document, the NOSB stated that the "intent of requiring pasture for ruminants is to ensure an organic production system that provides a living condition that allows the animals to satisfy their natural behavior patterns, provides preventative health care benefits and answers the consumer expectation of humane animal care. The intent is to incorporate a pasture plan as a required part of the organic livestock system plan." They also further state, "pasture management fulfills an integral role in nutrition, health care and living condition requirements of organic ruminant production."

During the Dairy Symposium on April 19, 2005 in Pennsylvania, Juan Velez of Aurora Organic was asked about the Aurora dairy operations. Mr. Velez explained that the cows were in "loose housing, access to fresh air, sunlight and expression of natural behaviors by grooming during the entire year."[2] Mr. Velez also stated, "our dry matter consumption for some of the lactating cows was around 5 percent in our Texas herd and between 3 and 5 percent in our Colorado herd during the lactating period."[3] While this description of Aurora Organic's dairy, or any other drylot, non-pasture based dairy, may satisfy the first housing requirement under the organic regulations, it clearly does not meet the additional requirement of access to pasture.

FACT believes there is a tendency for large-scale, drylot, non-pasture based dairies to respond to the pasture requirement as if outdoor access, fresh air and sunlight were the same thing as access to pasture. In fact, they are not. If that were the case, there would be no need for the clarification in section 205.239(a)(2), which specifically requires "access to pasture for ruminants."

And yet, despite this regulation, which on its own should be enforceable, non-pasture based dairy operations, that provide zero to minimal (3-5%) pasture for their lactating cows, persist and continue to receive organic certification. Since the current regulations clearly do not go far enough to ensure that legitimate access to pasture is provided, additional regulations are needed

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[1] http://www.ams.usda.gov/nosb/lscommRMR/recommendations/pasture.html
[2] Dairy Symposium transcripts, April 19, 2006. http://www.ams.usda.gov/nosb/transcripts/transcripts.html
[3] Ibid.

that will provide a well-defined measurement of pasture. This will not only clarify to the producer what is required, but will also provide objective measures for certifiers.

(2) If the current role of pasture as it is described in the NOP regulations is not adequate, what factors should be considered to change the role of pasture within the NOP regulations. Provide any available evidence in support of concerns raised.

There are several factors to consider. The first concern is whether or not the cows are actually grazing on pasture. John Stalley, in his comments during the Dairy Symposium, gave an example where, given the current regulations, a dairy operation could exploit the current access to pasture requirement through creative interpretation. Mr. Stalley states, "there are some interpretations that when I hear them, I can't believe what I'm hearing, seriously. Access to pasture. Okay. I cut the hay and I brought it across the road and I threw it – I gave it to the livestock. I fed it to the livestock. They have access to that pasture. I'm bringing it to them. Now that's not the intent. But that's a real life scenario from what I understand." FACT agrees with Mr. Stalley in that the intent Section 205.239(a)(2) was not to have a dairy farmer cut hay and feed it to their cattle. The intent was to have the cows grazing on pasture, receiving the benefits that pasture provides in terms of better animal welfare and a more environmentally harmonious system. Therefore, the regulation should be changed to specifically require that cows graze on pasture, meaning that they are actually eating the grasses and forages growing on that pasture.

The second factor to consider is the ability for all cows, both lactating and dry, to have adequate access to pasture. A minimum time requirement will address this concern. FACT believes the regulations should require that cows graze on pasture for a minimum of 120 days.

In addition, a measurable pasture intake requirement should be included in the regulations. FACT supports the 30% dry matter intake suggested by the NOSB in their March 18, 2005 NOSB Livestock Committee Recommendation for Guidance – Pasture Requirements for the National Organic Program. This ensures that cows not only have access to pasture for the 120 day minimum, but also have enough grazing time on pasture per day to constitute true pasture access. FACT believes this dry matter intake requirement prevents dairy producers from putting their cows on pasture for a few minutes a day and calling it "access to pasture." According to Kathy Soder, USDA Research Animal Scientist participating in the Dairy Symposium on April 18, 2006, the optimal time spent grazing is 8-9 hours per day, with 12-13 hours being a maximum, assuming no additional feed source is available.[4] According to calculations presented by Ms. Soder at the Dairy Symposium, it would take a 1000 lb. cow approximately 3.5 hours to consume 10 lbs. of dry matter, assuming that all the cow does is chew. However, cows are "going to chew, they are going to bite, they are going to search, they are going to look up at the neighbor."[5] Therefore, cows will need more than that 3.5 hours in order to consume 10 lbs. of dry matter. Ms. Soder further stated, "if you look at some of the behavior data, [cows] prefer to graze eight hours, rest eight hours, ruminate eight hours." [6]

[4] Ibid.
[5] Ibid.
[6] Ibid.

In this proposed rule as published in the Federal Register TM-05-14, it states, "This action is being taken by AMS to ensure that NOP regulations are clear and consistent..." FACT believes the regulations are not clear enough. Otherwise, there would not be large corporate dairies denying pasture access to their lactating cows, or providing little or no DMI from pasture, thereby violating the original intent of section 205.239(a)(2). The large majority of organic producers and organic consumers want milk-producing dairy cows to have access to pasture. This is supported by several recent consumer surveys. It has also been substantiated over and over again by the tens of thousands of comments via letters, signed petitions, and public testimony (in response to this ANPR and at previous NOSB meetings) that the NOP / NOSB has received supporting the need for minimum pasture standards. In addition, there is ample scientific and anecdotal evidence that supports pasture as a way to improve animal health and welfare. Scientists on the Pasture and Natural Resource Management Panel at the Dairy Symposium cited pasture, and animals grazing on pasture, as an important part in an ecologically friendly, sustainable organic agricultural system. Additional comments below will address these issues in further detail.

(3) Which parts of the NOP regulations should be changed to address the role of pasture in organic livestock management? Pasture appears in the NOP definitions (subpart B, section 205.2), and in subpart C of production and handling requirements under livestock feed (section 205.237), livestock healthcare (section 205.238), and livestock living conditions (section 205.239). Should the organic system plan requirements (section 205.201) be changed to introduce a specific means to measure and evaluate compliance with pasture requirements for all producers of dairy or other livestock operations? Or, should a new standard be developed just for pasture alone?

Livestock operations will need to outline in detail their pasture system, including management, pasture acreages, animal numbers, and planned DMI intake, in their organic system plans. No additional changes are needed to Section 205.201, which already requires a description of practices and procedures, adequate record keeping and monitoring of practices.

Changes to the regulation should be made as follows:

Subpart A - Definitions

Growing season for pasture. The time(s) of year when pasture growth is possible from natural precipitation or irrigation.

Dry matter intake (livestock feed). The quantity of total feed intake measured on a moisture-free basis in order to provide a consistent basis for comparison.

§ 205.237 Livestock feed.

(b) The producer of an organic operation must not:

(7) Prevent dairy animals from grazing pasture during lactation, except as allowed under §205.239(b).

(c) Ruminant livestock must graze pasture for the growing season but for not less than 120 days per year. The grazed pasture must provide a significant portion of the total feed requirements but not less than 30% of the dry matter intake on an average dairy basis during the growing season.

§ 205.239 Livestock living conditions.

(a) The producer of an organic livestock operation must establish and maintain livestock living conditions which accommodate the health and natural behavior of animals, including:

(1) Access to the outdoors, shade, shelter, exercise areas, fresh air, and direct sunlight suitable to the species, its stage of ~~production~~ life, the climate, and the environment;

(2) Access to pasture for ruminants, as required in 205.237(c).

(b) The producer of an organic livestock operation may provide temporary confinement for an animal because of:

(2) The animal's stage of ~~production~~ life; for ruminants this includes only:
(i) birthing;
(ii) dairy animals up to 6 months of age; or
(iii) beef animals during a final finishing stage not to exceed 90 days.

Comments - Questions for Consideration in Commenting on this ANPR

Consumer Preferences

Are there market-based or other types of research to substantiate an expectation by consumers that organic milk comes from dairy cows raised on pasture?

- A survey of 1,011 U.S. adults commissioned by the Center for Food Safety (CFS) found that six out of ten women who buy organic milk, and five out of ten organic milk purchasers overall, would no longer do so if they knew that many organic cows were confined to fenced-in feedlots and did not graze on pasture for most of their lives.[7]

[7] http://www.centerforfoodsafety.org/press_release4_12_2006-2.cfm

- More than two-thirds of all consumers and 75% of women in a Consumers Union (CU) survey of 1,485 U.S. online adults said that the national organic standards should require that animals graze outdoors. When asked specifically in the CU survey if they would still pay a premium price for organic milk that came from cows that were confined indoors and did not graze outdoors (have access to pasture), only 14% agreed that they would (60% disagreed, while 25% remained neutral).[8]
- Whole Foods Market conducted a survey of their customers via their *Fl@vors* email newsletter on April 12, 2006. 18,455 responses were received from April 12-13, 2006. In their survey, Whole Foods asked "*When choosing organic milk, cheese and other dairy products, what is important to you about the conditions in which the organic dairy cattle are raised? Check all that apply*." The highest rated response, receiving 12,779 votes (69%) was **"***Most of their food is from pasture.*" The second highest response was "*Spend more time outdoors than indoors"* with 11,113 responses, or 60% of consumers. And more than half of Whole Foods customers (51%) thought that cows "have access to the outdoors when they choose" was an important consideration when buying organic milk.[9]
- Commissioned by the USDA for the Dairy Symposium, the Natural Marketing Institute (NMI) surveyed 1000 online adults. Regarding the general public's attitudes about organic milk and dairy, while 63% thought "contain no artificial flavors" and "contain no hormones" were important, the response "are from animals that have been treated humanely" was statistically just as important at 62%.[10] FACT believes raising cows on pasture is humane. There are numerous scientific studies available that support pasture as a way to improve animal health and overall cow comfort, both of which are important components of animal welfare. These will be discussed in more detail in another section of these comments. While fewer of the respondents (55%) cited "are from animals that graze in a pasture" as an important consideration, this may realistically be explained by the reality that the general public is not aware of the link between pasture-based livestock systems and improved animal health and welfare.
- In the same study cited above, the same question was asked of organic dairy users. 80% responded that "are from animals that have been treated humanely" was important. 72% thought it was important that organic milk come from "animals that graze in a pasture." While these responses were not as significant as "contain no hormones" at 87%, it is interesting that basically the same number of organic dairy users (86%) thought "contain no artificial flavors" was important (86%).[11] Of course, milk, whether organic or not, does not contain artificial flavors. When looking at a carton of organic milk in the grocery store, one will routinely see marketing claims such as "no added hormones," "no antibiotics," and "no artificial colors or preservatives," a claim that appears on both organic and "all natural" products in the stores. However, one rarely sees "from cows raised on pasture." Therefore, it is very possible that strong marketing promotions have much to do with the responses received from consumers in this survey.
- Additionally, in reference to the study cited above from NMI, daily and heavy users of organic dairy products thought humane treatment and grazing in pasture was very

[8] Ibid.
[9] Dairy Symposium transcripts, April 18, 2006. http://www.ams.usda.gov/nosb/transcripts/transcripts.html
[10] Ibid.
[11] Ibid.

important. 79% thought pasture was important and 88% thought humane treatment was important.[12] Clearly, cows grazing on pasture and being treated humanely are statistically as important as no antibiotics, no hormones, and no artificial flavors, colors or preservatives.

- In a survey commissioned by USDA, the California Institute For Rural Studies, randomly selected 1000 consumers (Strohlic, 2005) and found that second to high price, the next reason consumers do not buy organic foods is due to lack of confidence about the organic seal (46.4%).[13] The survey found that consumers are not very well educated about the USDA program (only 37% were aware of the National Organic Standards). It is likely the revelation that dairy animals are not required to graze on pasture could damage confidence further. Strohlic concludes, "Nevertheless, mistrust of organic claims is high and efforts to uphold the integrity of the organic standards must be maintained in order to foster continued and increased consumer confidence."

Is there evidence, data, or other types of research that the role of pasture as it exists in the regulations does not support consumers' beliefs about the relationship between organic milk and organic dairy cows?

As mentioned above, marketing has a strong influence on consumer perceptions of the products they purchase, including organic milk. Animal production claims and pictures on the cartons all serve to "educate" the consumer about organic milk, whether or not the information is accurate. Marketers clearly believe that lazy cows grazing idyllically on pasture is what consumers want to see, which is why these images are plastered on milks cartons across the country. Consumers see these images and feel good about the milk they buy.

Consumers clearly believe grazing on pasture and humane treatment of animals is important. The above mentioned survey data certainly supports this observation. And yet, dairy operations who do not honor the intent of the regulation, and who deny pasture to their lactating cows, continue to receive organic certification. At a minimum, three quarters of organic dairy users think grazing pasture is an important consideration in organic production. And nine out of every ten heavy organic dairy users think it is important. Bottom line, pasture is important to the consumer.

In this ANPR, the USDA Department of Agriculture writes, "Appropriate access to pasture has been a topic of discussion for many years, including by the NOSB, because of a lack of statutory language and widely varying private certification standards for the relationship between ruminant animals, particularly dairy animals, and pasture." The 50,000 public comments supporting stricter pasture requirements for dairy production demonstrates that the public also feels the current regulations do not suffice. The example cited above in Question 2 of Comments – Scope of the ANPR, and the testimony of John Smalley indicates that there is widespread variance on the interpretation of "access to pasture" by individual certifiers, some of whom deny

[12] Ibid.
[13] Strohlic, Ron, 2005. "Regulating Organic: Impacts of the National Organic Standards on Consumer Awareness and Organic Consumption Patterns" California Institute for Rural Studies (CIRS). http://www.cirsinc.org/docs/Regulating_Organic.pdf

lactating cows access to pasture during the growing season. The Whole Foods Survey cited above showed that, when it comes to the conditions under which organic dairy cows are raised, *"Most of their food is from pasture*," is the most important. A DMI intake of 0 to 5% would most certainly fall short of this consumer expectation. In the CU survey, 60% of the organic dairy consumers said they would no longer pay a premium price for organic milk if it did not come from cows that graze outdoors and the CFS survey found that half of consumers would no longer buy organic milk if organic cows did not graze on pasture for most of their lives.

Access to Pasture

Is there evidence in dairy or animal science literature that supports an appropriate minimum amount of time that dairy cows (or other ruminant animals) should be kept on pasture?

There are several animal science studies that support grazing pasture. In some cases, the authors provide a time reference for pasture grazing. FACT acknowledges that the quality of management plays an important role in the welfare of dairy cows. However, with all things being equal in terms of management quality, these studies conclude that grazing cows on pasture provides substantial animal health benefits.

For example, in a study looking at risk factors for metritis (inflammation of the lining of the uterus), the authors looked at 2,144 herds totaling 102,600 cows. The risk for metritis was lower for cows in herds that grazed relative to cows in zero-grazing herds or in herds when cows grazed only when dry.[14] Since the typical dry period is 60 days, and since there is a clear benefit to grazing on pasture in terms of reducing the incidence of metritis, cows should be grazing on pasture as long as possible.

In a study looking at risk factors for mastitis, the authors looked at 4,256 heifers with mastitis and 67,072 control heifers without mastitis. They concluded that heifers kept on pasture during the summer months (the growing season) had a statistically significant decrease in the risk of mastitis.[15]

Other studies also support grazing pasture as a way to reduce the incidence of mastitis and improve animal welfare. In a study by Goldberg, et al., mean standard plate counts of bulk tank samples were lowest in rotationally grazed herds as compared to confined herds and continuously grazed herds.[16] High plate counts are linked to an increased incidence of mastitis. The authors concluded that managing cows on pasture may help reduce exposure to environmental pathogens and that using managed rotational grazing may be a practical alternative to enhance milk quality and improve mastitis control. In a study by G. M. Jones, the author also stated that pasture reduces the risk of environmental mastitis, but notes that pastures

[14]Bruun, J., A.K. Ersboll and L. Alban, 2002. Risk Factors for Metritis in Danish Dairy Cows. Preventive Veterinary Medicine, Volume 54, pp. 179-190.
[15] Waage, S., S. Sviland and S.A. Odegaard, 1998. Identification of Risk Factors for Clinical Mastitis in Dairy Heifers. J. Dairy Science, Volume 81, pp. 1275-1284.
[16] Goldberg, J. J., E. E. Wildman, J. W. Pankey, J. R. Kunkel, D. B. Howard, and B. M. Murphy, 1992. The Influence of Intensively Managed Rotational Grazing, Traditional Continuous Grazing, and Confinement Housing on Bulk Tank Milk Quality and Udder Health. Journal of Dairy Science, Volume 75, pp. 96-104.

should be well managed to prevent muddy areas. Jones notes that exposure [to environmental pathogens] is increased when cows on dry lots have limited or no access to shade trees.[17]

In a study evaluating teat end microflora, populations of environmental pathogens were lower on pastured cattle than on confined cattle.[18] Washburn, et al., in a 4-year study looking at reproduction, mastitis and body condition of cows in a pasture versus confinement system, the authors concluded that pastured cows had fewer clinical cases of mastitis. Although they also had lower body weights and body condition scores, the authors stated that this may not indicate a problem unless milk production, reproduction or health is compromised, which was not the case in this study. In addition, body conditions improved as lactations progressed.[19]

In a 4-year study comparing pasture and confinement systems (with access to outdoor drylot), pasture systems saw a significant reduction in the occurrence of mastitis and had lower cull rates and lower feed costs.[20]

There are also numerous studies that clearly demonstrate the incidence of lameness is greatly reduced in a pasture system. Somers, et al., concluded that cows housed greater than 75 days at the end of pasture season had a 1.9 fold increase in digital dermatitis (DD) versus those housed less than/equal to 25 days. In addition, first parity and lactating cows were at higher risk for DD. Those with full access to pasture during the summer were at a lower risk. [21]

In another study by Somers, looking at 87 herds and 5,077 cows, the incidence of interdigital dermatitis and heel erosion (IDHE) was highly associated with restricted grazing time during the summer. The authors indicated that this might be because cows with full access to pasture during the summer are not exposed to the unfavorable housing environment versus those cows with restricted access to pasture. They also suggest that minor lesions of IDHE may heal spontaneously on pasture, and therefore, cows with full access to pasture can take advantage of this curative effect.[22]

Rodriguez-Lainz, et al., found that cows on pasture were less likely to have Papillomatous Digital Dermatitis (PDD). These findings are in agreement with other large-scale PDD studies.

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[17] G. M. Jones, Professor of Dairy Science, Extension Dairy Scientist. Milk Quality and Milking Management Proper Dry Cow Management Critical for Mastitis Control. Virginia Tech, Virginia Cooperative Extension. Publication Number 404-212, posted May 1999

[18] Eberhart, R. J., R. A. Wilson, E. Oldham, and T. Lintner. 1987. Environmental effects of teat skin microflora, Page 71 in 26th Annual Meeting National Mastitis Council, Orlando, FL, National Mastitis Council, Arlington, VA

[19] S.P. Washburn, S.L. White, J.T. Green Jr. and G.A. Benson, 2002. Reproduction, Mastitis and Body Condition of Seasonally Calved Holsteins and Jersey Cows in Confinement or Pasture Systems. J. Dairy Science, Volume 85, pp. 105-111.

[20] White, S.L., G.A. Benson, S.P. Washburn and J.T. Green, Jr., 2002. Milk Production and Economic Measures in Confinement or Pasture Systems Using Seasonally Calved Holsteins and Jersey Cows. J. Dairy Science, Volume 85, pp. 95-104.

[21] Somers, J.G.C.J. , K. Frankena, E. N. Noordhuizen-Stassen, J.H.M. Metz, 2005. Risk Factors for Digital Dermititis in Dairy Cows Kept in Cubicle Houses in the Netherlands. Preventive Veterinary Medicine, Volume 71, pp. 11-21.

[22] Somers, J.G.C.J. , K. Frankena, E. N. Noordhuizen-Stassen, J.H.M. Metz, 2005. Risk Factors for Interdigital Dermatitis and Heel Erosion in Dairy Cows Kept in Cubicle Houses in the Netherlands. Preventive Veterinary Medicine, Volume 71, pp. 23-34.

[23] Interestingly, there was also a significant association between buying replacement heifers and an increased risk for PDD, which is consistent with other studies.

Keil, et al., found that exercise of long duration is generally associated with low prevalence of hock lesions, whereas frequent exercise of short duration is associated with high prevalence of lesions. The authors also concluded that "having the cows remain outdoors for long periods of time is only possible in the case of pasture where cows move about while grazing and are also able to lie comfortably. By contrast, short periods of exercise include all occasions of being in the outdoor run where cows mainly stand and normally do not lie down due to the limited space and the inappropriate surface (mostly concrete or dirt surface, or rarely, wood shavings)."[24]

Wells, et al., looked at associated risk factors for PDD in US herds. The authors found that Cows housed on drylot versus those on pasture were three times more likely to develop papillomatuous. The incidence of papillomatuous digital dermatitis among lactating cows housed only in drylots was 36.6% versus 10.7% for cows housed in pasture. Cows housed in pasture and drylot had a 21% incidence of PDD.[25]

Murray, et al., also studied lameness in dairy cattle. They concluded, based on a study of 5000 dairy cattle, that the incidence of hoof lesions was lower for cows on grass. In addition, the incidence of hoof lesions was lower in summer when cows were grazing on pasture than it was during the winter months when cows were housed indoors.[26]

Frankena, et. al, reported that the effects of grazing included less severe hoof disorders and recovery from such disorders.[27] Singh, et al., found fewer and less severe sole lesions on cows who were on pasture versus those indoors. They also observed longer lying times and less transition between lying and standing for cows on pasture, which are indicators of cow comfort.[28]

With regard to cow comfort and behavior, Ketelaar-de Lauwere, et al., found that cows spend 80-99.6% of their time lying when they have they have access to pasture. Again, lying time is a indicator of cow comfort and health. They also concluded that their findings support improved animal welfare. When cows had a choice between indoors and outdoors, they spent most of their

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[23] Rodriguez-Lainz, Alfonso, Pedrop Melendez-Retamal, David W. Hird, Deryck H. Read and Richard Walker, 1999. Farm- and Host-Level Risk Factors for Papillomatous Digital Dermititis in Chilean Dairy Cattle. Preventive Veterinary Medicine, Volume 42, pp. 87-97.

[24] Keil, N.M., T.U. Wiederkehr, K. Friedli and B. Wexchsler, 2005 (in press). Effects of Frequency and Duration of Outdoor Exercise on the Prevalence of Hock Lesions in Tied Swish Dairy Cows. Preventive Veterinary Medicine.

[25] Wells, S.J., L.P. Garber and B.A. Wagner, 1999. Papillomatous Digital Dermatitis and Associated Risk Factors in US Dairy Herds. Preventive Veterinary Medicine. Volume 38, pp. 11-24.

[26] Murray, R.D., D.Y. Downham, M.J. Clarkson, W.B. Faull, J.W. Hughes, F.J. Manson, J.B. Merritt, W.B. Russell, J.E. Sutherst and W. R. Ward. Epidemiology of Lameness in Dairy Cattle: Descpription and Analysis of Foot Lesions. Veterinary Record 1996, Volume 138, pp. 586-591.

[27] Frankena, K., E. N. Stassen, J.P.T.M.Noordhuizen, J.O. Goelema, J. Schipper, H. Smelt, H. Romkema. Prevalence of lameness and risk indicators for dermatitis interdigitalis during pasturing and housing of dairy cattle. In: Thursfield, M.V. (Ed.), Proc. Annual Symp, Soc. Vet. Epidemiol. Prev. Med., London, pp. 107-118.

[28] Singh, S.S., Ward, W.R., Lautenbach, J.W., Hughes, J.W. and Murray, R.D., 1993. Behaviour of first lactation and adult dairy cows while housed and at pasture and its relationship with sole lesions. Vet. Rec. 133:469-474.

lying time in pasture. The authors stated "grazing seems to be advantageous for the welfare of the cows, as they clearly preferred to lie in the pasture rather than in the cubicles."[29]

James Nocek states, in his study on hoof health and cow comfort that "when observed in her natural habitat, the cow had been adapted to eating in a natural grazing position, as in pasture. Studies have shown that cows will eat longer and produce more saliva during the eating process when they are consuming food in a grazing vs. a more horizontal position." Nocek further stated that it is a natural behavior to graze, which in turn produces more saliva, which aids in rumination.[30]

Finally, Roy Berghaus, et al., looked at the risk factors associated with hemorrhagic bowel syndrome. The authors state, "Operations with RHA (Rolling Herd Average) milk production of <20,000 lb. That used pasture as part of the forage ration had odds of observing HBS that were approximately a hundredth of those for operations with similar milk production that did not use pasture during the growing season. For operations with RHA milk production of >20,000 lbs, a significant association between pasture use and occurrence of HBS was not identified, although point estimate of the OR suggested that even for high-producing operations, use of pasture as part of the forage ration was associated with a decreased risk of HBS." They also state that "the mechanism by which pasture consumption might be associated with a decreased risk of HBS is unclear, although previous reports have suggested that HBS is less common during spring and summer, which would be consistent with the seasonal availability of pasture across most of the United States." The authors conclude that "current trends in the dairy industry toward larger herd sizes with more intensive nutritional management and less opportunity for cattle to graze on pasture may be responsible for the apparent increase in the occurrence of this disease."[31]

All of these studies support the use of pasture to improve animal health and cow comfort. In many cases, the authors refer to being on pasture during the summer months or during the growing season. Clearly, the longer the time grazing on pasture, the more likely the cows are to benefit from pasture's restorative properties.

Aside from the scientific literature, other specialists have commented on the pasture requirements. Lisa McCrory, Dairy and Livestock Advisor & Grazing Consultant for NOFA-Vermont provided public comment during the Dairy Symposium that supports pasture requirements. She stated "there are numerous pieces of literature to substantiate the benefits and attributes to keeping dairy animal on pasture…I am aware that the NOSB has also provided numerous research reports to support that many benefits of pasture including environmental, economic, animal health, and increased nutritional value of the meat and/or milk. By providing access to edible pasture, producers are putting the cows back in their natural environment where they can walk on soft, cushiony ground, harvest edible, nutritious forage, and have access to fresh air & sunlight. Many producers that I work with in Vermont have set up their milking

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[29] C.C. Ketelaar-de Lauwere, et al. Voluntary automatic milking in combination with grazing of dairy cows. Milking frequency and effects on behaviour. Applied Animal Behaviour Science, February 10,1999.

[30] Nocek, James E., Hoof Health: Managing Cow Comfort to Reduce Lameness. Biovance technology, Omaha, NE, 2000.

[31] Berghaus, Roy D, Brian J. McCLuskey, and Robert J. Callan, 2005. Risk factors associated with hemorrhagic bowel syndrome in dairy cattle. JAVMA, Vol 226, No. 10, May 15, 2005.

systems in such a way that the cows are milked quickly and efficiently and sent out on fresh pasture after each milking. In situation like these, the cows are on pasture for at least 20 hours a day." [32]

Is there evidence in dairy or animal science literature that supports a minimum amount of feed that should come from pasture?

There are dairy operations in this country that rely solely on pasture during the growing season, and some that are 100% grass-based on a year round basis. There are also farms in other countries, such as New Zealand, that rely on pasture year round, to supply 100% of the cow's intake, other than perhaps salt and some minerals. Studies done by Tilak Dhiman at Utah State University show that there is a linear relationship between pasture intake and levels of beneficial fatty acids in milk and meat—the higher the levels of pasture intake, the higher the levels of beneficial fatty acids like CLA and omega 3.[33]

Science suggests that 100% pasture intake would give the consumers the most nutritional benefit. USDA/AMS is working on a process-verified grass-fed marketing claim that will address feeding pasture year round (99%). The consensus among organic dairy producers (NODPA, MODPA, WODPA, CROPP Cooperative, Humboldt Creamery, Michigan Organic Dairy Producers, Organic Choice, DMS Advisory Committee) and the vast majority of the organic community is that 30% dry matter intake should be the very minimum amount of pasture intake during the growing season. Many organic dairy producers will supply more pasture intake than this minimum level. The 30% DMI figure is the byproduct of a long collaboration between stakeholders in the organic dairy community, which resulted in the near consensus of support for the proposed benchmarks and was a compromise from higher proposed DMI levels initially discussed.

Should age and reproductive cycle of the animal be taken into account in determining the minimum amount of time an animal spends on pasture or the amount of feed derived from pasture?

It is natural for ruminants of all ages to be on pasture, and many dairy operations do have all their dairy animals on pasture from calves on up. However, the consensus of dairy producers supports the NOSB recommendation to allow exemption from pasture for dairy youngstock less than six months of age. FACT supports this exemption for dairy calves under 6 months of age as well. Other than a temporary exemption for the process of birthing (which can also take place most successfully on pasture but in some cases may require human assistance), there should be no exemption from pasture for any other part of the production or reproductive cycles. Lactating and dry cows should be required to have access to pasture during the growing season, but not for less than 120 days.

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[32] Dairy Symposium public comments, April 18, 2006.

[33] Dhiman, T.R., et. al., 1999. "Conjugated Linoleic Acid Content of Milk from Cows Fed Different Diets." *Journal of Dairy Science* 82:2146-2156

Ruminant Animal Nutrition

What is the appropriate contribution of pasture to ruminant animal nutrition?

In an ideal world, ruminants should be receiving most if not all of their nutrition from pasture during the growing season. Some producers are moving towards a system where the concentrate fed per cow is just a few pounds of grain a day or no grain at all. Asking for a minimum benchmark of 30% dry matter from edible pasture is a very reasonable request and has been agreed upon by producers across the United States and the Livestock Committee of the NOSB.

What would the effect be to require a minimum dry matter intake (DMI) of 30 percent derived from pasture?

There would be no effect on the vast majority of organic livestock farms as they are already meeting or exceeding 30% DMI. A poll of organic dairy producers, conducted last year by The Cornucopia Institute, and submitted in formal testimony before the NOSB on August 15, 2005, found that 85% of organic dairy producers in the United States currently meet or exceed the 120 day/30% DMI standard and fully supported the proposed requirements. An additional 7% said that although they would have to make minor modifications to their operation, they were also in full support of the benchmarks.[34] Only 1% indicated that they objected to the proposed benchmarks.

Those producers who are not meeting the 30% DMI and 120 days minimum requirements will need to make adjustments to their operation in order to come into compliance. For example, they may need to convert more land into pasture. This may include land currently being used for crop production. However, since the animals will be grazing this land, it will still be used as a feed source for the animals. The only difference is that the cow will now be harvesting the forages themselves rather than the forages being mechanically harvested and delivered via feedbunks to the cows. Producers may also need to convert drylot/dirt-based areas into pasture as needed. Other producers may need to reduce the number of animals on their already existing pastures, or break their herd up into smaller units so there would be a balance between the numbers of animals and the land available for grazing. There are numerous studies on grazing that demonstrate the economics of a grazing farm are as good as, and in many cases better than, confinement operations. Therefore, the long-term economic health of the farm should be the same, if not better. These studies are included at the end of these comments in the appendix.

Is this an achievable goal?

FACT believes it is. Dairy operations across the country, in all types of climates, are doing this successfully. In some cases, as was documented at the Dairy Symposium in April, although a farmer on the producer panel objected to the 30% DMI, saying it was not achievable, another

[34] www.cornucopia.org/index/php/13 and NOSB meeting transcripts, August 15, 2005.

farmer quickly pointed out that all his neighbors (who experience the same weather conditions and have the same growing season) were achieving, if not surpassing, the 30% figure.[35]

Many of the panelists at the Dairy Symposium also believed this was achievable, including most of the farmers on the Dairy Production Panel, all three certifiers on the Compliance and Enforcement Panel, and Lisa McCrory on the Pasture and Natural Resource Management Panel.

In addition, dairy producers from across the country, including those from the largest dairy cooperatives and associations (NODPA, WODPA, MODPA, CROPP Cooperative, Humboldt Creamery, Michigan Organic Dairy Producers, Organic Choice, and DMS Advisory Committee) have come out publicly in support of the 30% DMI requirement.

What evidence is available to support 30 percent as a benchmark?

As mentioned above, last year the Cornucopia Institute conducted a poll of organic dairy producers across the country. They found that 85% of organic dairy producers in the United States currently meet or exceed the 120 day/30% DMI benchmarks. An additional 7% said that they would have to make minor modifications to their operation and were willing to do so. It appears that most organic dairy operations are already achieving this benchmark.

As mentioned previously, the 30% figure came about through collaboration and compromise between dairy producers and their supporters, including FACT. Like many other numerical parameters in the NOP Rule, the 30% DMI requirement is a number that makes good, practical sense and is one that is achievable by the large majority of dairy producers currently in production.

What factors could affect a minimum DMI variable?

There are many factors that can affect DMI. Many of these factors were addressed in the Dairy Symposium. Examples given during the Dairy Symposium include the quality of pasture in terms of maturity and available forages, the acreage of pasture allocated to grazing, the weather conditions, how often cows are moved to new pasture, whether or not the animal ate before being put out to pasture, how long the cows are on pasture, at what time of the day the cows are put on pasture, etc. Most of these factors are under the control of the dairy producers and can be managed to optimize the amount of pasture and dry matter that is available to the cows.

Does pasture quality affect DMI?

Yes. If the growth is too high or too mature, the cows will eat less. Also, certain species of forages are more palatable to cows than others. If there is too little re-growth or if the density of the stand is very low so that little intake is achieved with each bite, there will be reduced dry

[35] Dairy Symposium transcripts, April 19, 2006. http://www.ams.usda.gov/nosb/transcripts/transcripts.html

matter intake. Again, these factors are all under the control of the farmer and grazing specialists are available to help farmers achieve the 30% requirement.

Can DMI be affected by factors beyond producers' control, such as weather-related events (e.g., flood or drought)?

Yes. Severe flooding or drought can affect DMI by reducing the amount of pasture regrowth during a period of drought, or by reducing the availability of pasture during a flood. If these are typical events for a farm, then they need to be considered and planned for in the operation's OSP (organic system plan). For example, if certain low-lying pastures on the farm are typically under water during heavy rains, that farm will need to ensure that there are other pastures/paddocks available for the cows when those areas flood or when excessive rainfall is expected. If a dairy operation is located in an arid area, they will need to provide for irrigation of pasture, just as irrigation must be provided to grow other feed crops such as alfalfa and corn. If flood or drought is rare (meaning these events do not occur year after year), then they could be managed by the temporary exemption allowed in 205.239(b). This period of time would be documented in the Organic System Plan and in records maintained by the operation.

Is it useful to establish a single benchmark or measure, such as minimum DMI, for all dairy operations in the United States and all foreign organic operations who want to be certified to the NOP standard?

FACT believes a minimum benchmark is essential. This levels the playing field for all organic dairy producers, allowing farms of all sizes to participate in organic dairy production, and creates a more equitable production system. One organic milk producer states that if large "dairies don't invest in the cost of land for pasture, they can sell their milk for less."[36] That puts smaller producers, adhering to the intent of the organic regulations, at a disadvantage in a market they helped to create. This should not be the case.

Creating a measurable minimum DMI requirement from pasture that is clear, consistent and enforceable will ensure that dairy animals are being managed in a way intended for the production of organic milk.

There is also a level of consumer confidence that comes from knowing that regardless of the milk brand a consumer purchases, s/he can be assured that the milk comes from cows on pasture. If some organic milk brands come from cows on pasture, and other brands come from cows on factory-farm type dry-lots, the consumer will be bombarded with messages about the loss of integrity of organic milk, which can only hurt organic milk production, and organic production in general, by decreasing demand. Consumers do not want to pay a premium for organic food if they are not getting what they think they are getting. The study by the Center for Food Safety confirms this observation.

[36] Clarren, Rebecca. "Land of Milk and Honey." Salon.com, April 13, 2005.

Please provide input on how the regulations should address forage nutritional quality factors such as crude protein, acid detergent fiber, neutral detergent fiber and net energy for lactation? Is this level of detail adequate to ensure the role of pasture is met for organic livestock management under the NOP regulations?

This level of detail and oversight would be beyond the scope of certification. There is no current quality requirement in the regulation for stored feed and it should be no different for pasture. It is in the best interest of producers to ensure that the pasture is providing quality feed for their livestock, as is the case with stored feed. For some producers, there will be a learning curve, just as there is a learning curve in other parts of organic production.

Minimum Pasture Requirements

Please provide input on the implications of adopting a minimum pasture requirement, such as required that dairy animals should spend at least 120 days on pasture.

The rule needs to be written such that ruminants (except for the exceptions granted by the NOSB) are grazing pasture for the <u>full</u> growing season, but not less than 120 days per year. For example, a dairy farm in the northeast could be grazing for at least 180 days at a minimum of 30% dry matter intake. Some operations in western Oregon and Colorado might have close to a 300-day growing season, but in northern Minnesota it may only be 120 days—the minimum. A farm in an area that only had a 90-day growing season could not qualify for USDA organic certification. Dairy cows (as well as other organic ruminants) should be on pasture for as long as possible during the FULL growing season, but for at least 120 days.

However, FACT believes that having only a 120 day requirement for pasture is not enough to ensure that animals are actually grazing on pasture as the 205.239(a)(2) intended. A 120-day requirement alone does not guarantee anything other than that cows set foot on pasture for 120 days out of the year. If the pastures are not managed well, if the cows fill up on feed rations before being let out to pasture, or if the cows are only out on pasture for a few hours a day, then the cows will not consume substantial pasture and there will very minimal pasture intake. Because there are certified organic dairy operations that currently provide zero or insignificant DMI from pasture to their lactating cows, the only way to ensure significant pasture intake is to also include a minimum DMI, 30% DMI being the overwhelming consensus of dairy producers and advocacy groups. Together, these two requirements will fulfill the expectation of organic consumers and the intent of the original organic regulation.

How would the 120 days be counted?

Farmers will need to keep a record of the total number of days per calendar year the cows are on pasture. When a dairy operation is located in an area with a short growing season (one that will be close to only achieving the 120-day minimum on pasture) each day that livestock are on pasture can be counted as part of the minimum 120 days as long as the pasture intake is high enough to keep the average DMI intake above 30%.

What evidence in dairy science or animal literature helps explain the appropriate amount of minimum time that dairy cows should be kept on pasture?

This question was previously posed and addressed under the Access to Pasture section.

Is the minimum time spent on pasture based primarily on the quality of the pasture, or the quantity of the feed provided by the pasture?

It is based on the time period when pasture can grow given rainfall, or irrigation (if natural precipitation is inadequate to promote plant growth), which would impact quantity of feed provided from pasture. The quality of the pastures available to the cows depends in great part on the management decisions of the farmer. In many ways, the farmer is in control of pasture quality in the same way a farmer would be in control of crop quality.

How is the pasture requirement affected by drought, flood, or other natural disaster?

This question was asked and answered under the Animal Nutrition section. The NOP rules allow an exemption for temporary confinement due to inclement weather or risk to soil or water quality. This should give the certifiers some flexibility if geographic areas or individual farms experience **unusual** natural disasters, floods, or droughts and cannot meet the minimum requirements. However, this would not be the norm. Normal weather patterns, including annual drought or flood, need to be addressed in the OSP.

Should pasture condition or quality be considered?

It should be considered, but should not be part of the rule change. Certification inspectors must carefully monitor pastures to ensure that the definition of pasture stated in the current regulations is maintained, safeguarding soil and water quality and animal health, and not be compromised by too high a stocking rate or poor pasture management. This should already be covered in Rule via the definition of pasture.

This question, in part, is also answered in the following question.

Should there be a minimum pasture quality requirement?

Pasture quality should be left up to the dairy producer. Of course, the better the quality of pasture, the easier it will be to reach the required DMI, so it is in the best interest of the farmer to maintain high quality pastures. Good quality pastures will also be more nutritious for the cows, and may reduce the amount of purchased feed and TMR needed, which can save the farmer money in terms of feed costs. There is a wealth of information and technical support for farmers

wanting to learn more about grazing management to improve the pasture quality. There is no current quality requirement in the regulation for stored feed so it should be no different for pasture.

Should specific animal-unit stocking rates per acre be considered? How?

"Organic is about balancing the amount of land with the amount of animals and the health of the animals."[37] However, appropriate stocking rates can vary depending on the farm, the season and the pasture conditions. Grazing animals on pasture, when managed appropriately, and at an appropriate stocking density, improves soil and air quality and eliminates many manure management issues, as manure is spread by the animals as they walk, not stored in large outdoor lagoons.

However, the EU does have animal-unit stocking densities in their organic food production regulations. In Annex VII, the maximum number of animal per ha (hectare) is 2 for dairy cows (1 hectare = 2.47 acres, or 2 cows for every 2.47 acres). This stocking density is based on the amount of manure an animal produces, equivalent to 170kg N/ha/year.

FACT supports a system that is environmentally friendly, humane and sustainable. We believe that producers should be responsible for finding the balance on their farms between the available acreage and pasture intake levels and the number of cows in the herd.

In lieu of a uniform pasture requirement, could a time range (based on the field quality, number of cows, type of operation, and other farm-specific factors included in the organic system plan) adequately or appropriately define the role of pasture in organic livestock management?

A time range would still have a minimum number of days the cows should be on pasture. FACT supports the 120-day, 30% DMI minimum as previously discussed in these comments.

Measurement, Enforcement, and Compliance

How would an accredited certifying agent appropriately measure compliance with specific measures adopted to change the role of pasture? For example, if dry matter intake is used as a benchmark, should it be measured as the average DMI over a certain time period, such as a calendar year or average 12 months?

This issue was discussed at length in the Dairy Symposium. FACT believes that DMI should be measured as an average over the full growing season, not over the calendar year. If the DMI is measured as an average over the growing season, this provides some flexibility for the dairy producer, as there will be some days during the course of the growing season where intake will be less than 30% and other days where DMI will exceed the 30% minimum.

[37] Clarren, Rebecca,"Land of Milk and Honey," Salon.com, April 13, 2005.

How should producers and certifying agents verify compliance over time for a herd of cows that are at various stages of growth or have varying states of nutritional needs?

FACT believes this issue is best determined by a consensus between organic dairy producers and organic certifiers. However, Lisa McCrory, in her testimony at the Dairy Symposium, suggested that worksheets should be available in inspection reports to make this process easier. Rather than calculating DMI down to the individual cow level, the measurable amount of dry matter needed per average cow per day (24-hour period) for the growing season should be used.

Can the producer and certifying agent determine this in the organic system plan?

The plan to reach 120 days on pasture (at a minimum) and 30% DMI should be included in the OSP. This was supported by all three certifiers on the Compliance and Enforcement Panel at the Dairy Symposium.

Market and Other Impacts

What are the effects on a dairy operation's cost of production (both fixed and variable) if the regulation is amended to include requirements such as minimum time or minimum amount of feed derived from pasture?

There are numerous studies that support a grazing system as a profitable economic model. They are listed at the end of these comments. In general, pasture intake reduces the amount of purchased feed, which saves the farmer money in terms of feed costs (the highest cost of animal production). Studies also show that medical and veterinary costs are reduced and there are numerous studies that demonstrate the benefits of pasture on animal health. Other economic benefits of pasture include more lactations per cow and lower cull rates.

For those operations that are not in compliance, there will be some initial capital costs, which may include fencing, water lines and water tanks, lane construction and conversion of dirt or cropland to pasture (seeding), when transitioning to a grazing system. Even with these types of costs included, a 4-year study comparing pasture and confinement systems (with access to outdoor drylot) concluded that pasture systems and confinement systems were equally profitable. Although pastured cows produced 11.1% less milk, pasture systems made up for the difference in milk output with a significant reduction in the occurrence of mastitis, lower cull rates, and lower feed costs.[38]

However, the NOP Standards, including the "access to pasture" requirement under 205.239(a)(2), have been in effect since 2002. In reality, all producers should already be in compliance. Any operations that now have to make additional investments to come into

[38] White, S.L., G.A. Benson, S.P. Washburn and J.T. Green, Jr., 2002. Milk Production and Economic Measures in Confinement or Pasture Systems Using Seasonally Calved Holsteins and Jersey Cows. J. Dairy Science, Volume 85, pp. 95-104.

compliance will simply be doing what they should have done previously, finally putting them on the same level of playing field as their organic pasturing peers. James Miller, an organic dairy farmer from Wisconsin states, "This is matter of fairness and ethics. When we certified our 1475 acres and 340 cows organic we went to the expense and effort to convert our very best and most fertile fields, surrounding the barn, to pasture. We should not be put at a competitive disadvantage by taking the high road [providing pasture] in organics." Like many other farmers who wanted to farm organically, James Miller made the investment in pastures for his cows. Large operations should be required to do the same.

Is there a relationship between the number of cows and number of acres on a farm and the producer's ability to comply with minimum pasture requirements?

The number of animals should be in balance with the number of acres available for grazing. According to the Livestock Committee Recommendation on Pasture from June 7, 2001, "organic pasture management reflects a synthesis of crop and livestock production principles that works from the soil up to promote an interdependent community of plants and ruminants. Organic managed pasture should produce the quantity and quality of edible plants suitable to the species, stage of production, and number of animals."

This was also partially addressed above under the Ruminant Animal Nutrition section. For example, some farms may have to allocate some land from crop production to pasture use to create the necessary symbiotic relationship. Other operations may need to reduce the size of the herd size or split the herd into smaller groups, making it easier to move them from milking parlor to pasture.

How does the age of the animal, its stage of development, and feed from pasture, interact to affect milk output?

The typical milk output of a cow increases from initial freshening, often around two years of age, to reach a peak beginning around five years of age. High levels of milk production can be maintained even with extensive amounts of pasture intake. However, there are several other variables that affect milk production. These include pasture quality and quantity, the breed of the cow (i.e., Jerseys generally produce less milk than Holsteins), the genetics of the cow, supplemental feed management, disease and illness and the goals of the farmer. In general, the dairy industry recognizes and plans for the impact that pasture has on milk production when they take into account the increase in milk production during the "spring flush".

How would a larger role for pasture affect supplies of organic and non-organic milk and milk products? Please provide any evidence or research to support your discussion.

In some cases, it is possible that supplies could decrease slightly due to management changes at some of the larger dairies. High quality pastures will not be available immediately and it is possible that overall milk output will decrease until pastures improve.

However, if the playing field is not leveled and large corporate dairies that do not provide pasture for their cows (both dry and lactating) continue to proliferate, it is possible that these dairies may flood the market with organic milk, produced at a lower cost. Smaller farmers, who launched the organic movement, may not be able to compete, as their costs will be higher (due to acreage needed for pastures and the labor necessary to maintain high quality pastures). These smaller farmers may be forced to abandon organic milk production altogether, which in turn may reduce milk supplies.

However, if this happens (and there is no doubt this is what the large corporate dairies are hoping will happen -- loss of small farmers and corporate control of organic dairy and food production), it's also very likely that organic consumers will migrate away from organic milk to milk that is grassfed. A June 4, 2006 article in Time Magazine writes about "The Grass-fed revolution."[39] Recent articles in the Chicago Tribune[40], the New York Times[41] and ABC News[42] discuss the benefits of grass-based foods and the pasture controversy in organic milk. A recent study by the Union of Concerned Scientists entitled "Greener Pastures" hails the benefits of grassfed meats and dairy.[43] Farmers are turning to grass-based farming as a way to tap into this growing market niche, including Bill Kurtis, a well-known and well-respected journalist, who is garnering enormous media attention. Chefs are adding grassfed products to their menus. Public comments from Wedge Co-op dated May 1, 2006 clearly demonstrate the migration they have seen to grass-fed dairy products.[44] And, the USDA has recently proposed a new grassfed label that is expected to receive tremendous support.

In addition, the study by the Center for Food Safety which found that 50% of the consumers surveyed said they would no longer buy organic milk if it did not come from cows that graze on pasture for most of their lives. Plus, Whole Foods is developing its own marketing label that will clearly distinguish products that meet the company's standards, which includes pasture for dairy cows. It is very likely consumers will be more likely to purchase products that are labeled "animal compassionate" versus those that are not.

Grass-fed, pasture-based foods are not the only niche that could pull consumers away from organics. "Buy Local" is also a growing trend. According to the New York Times, "six years ago 'organic' was the next big thing in grocer shopping, but the term has begun to lose its luster. It has been co-opted by agribusiness, which has succeeded in watering down the restriction of the definition. Today 'local' and 'sustainable' are the new culinary buzzwords."[45] New books by well know authors including Michael Pollan (Omnivores Dilemma) and Eric Schlosser (Chew On This) question the integrity of organic foods, guiding consumers to their local farmers markets instead.

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[39] The Grass-fed Revolution. Time Magazine
[40] Vettel, Phil. "No Bull." Chicago Tribune. April 27, 2006.
[41] Burros, Marian. "Does Organic Imply Grazing?" The New York Times, September, 14, 2005.
[42] Onion, Amanda. "Dispute: What Makes Milk Organic? ABC News, March 14, 2005.
[43] http://www.ucsusa.org/food_and_environment/sustainable_food/greener-pastures.html
[44] http://www.ams.usda.gov/nosb/PublicComments
[45] Burros, Marian. "In Oregon, Thinking Local." New York Times, January 4, 2006.

Therefore, while the potential for a temporary decline in organic milk production exists if the pasture regulation changes are not implemented and enforced, the potential for a significant loss in demand is far greater and will have more of a detrimental effect on future organic milk sales. Ron Strohlic, in his study for the California Institute for Rural Studies (CIRS), stated "mistrust of organic claims is high."[46] This loss in demand may not only affect organic milk, but other organic product categories as well. For, as the Natural Marketing Institute pointed out in their presentation at the Dairy Symposium, users of organic milk and dairy are also significant users of other organic categories as well.[47]

As to how a larger role for pasture might affect supplies of non-organic milk, it seems that question is beyond the interest and scope of this ANPR, which is concerned with organic milk.

What are the effects on consumer prices for dairy products if the NOP regulations include a larger role for pasture on dairy livestock producers?

FACT believes the change would be minimal. Most producers are already meeting the proposed requirements. A poll of organic dairy producers conducted last year by The Cornucopia Institute found that 86% organic dairy producers in the United States currently meet or exceed the 120-day/30% DMI benchmarks, with an additional 7% saying they would have to make minor modifications to their operation. Therefore, for many producers, the cost of production should be the same.

How would a larger role for pasture affect the geographical distribution of organic dairy production operations within the United States and foreign countries? Please provide any evidence or research to support your discussion.

Pasture-based organic dairy operations already exist across the country, including in Colorado, California, Idaho, and Texas. There are some areas of the country that are not conducive to pasture-based dairying (for example, New Mexico). However, just as it is inappropriate for farmers in Chicago, IL to raise pineapples, it is inappropriate for dairy operations to settle in dry, arid areas of the country.

It is difficult to say how more clearly defined pasture requirements would affect the placement of organic dairies in other parts of the world. Countries like New Zealand, Australia, Ireland and many EU countries already have pastured-based systems in place. For example, Danish regulations read, "All animals shall, in the period from 15th April to 1st November, have access to grazing a minimum of 150 days. Exceptions are animals in their first weeks of life where they can be kept indoors and slaughter pigs after weaning and bulls older than 1 year. Calves younger than 4 month old can be kept indoors. Calves between 4 and 6 month old must have access to pasture in the period from May 1st to September 1st when weather permits." (Translation from

[46] Strohlic, Ron, 2005. "Regulating Organic: Impacts of the National Organic Standards on Consumer Awareness and Organic Consumption Patterns" California Institute for Rural Studies (CIRS). http://www.cirsinc.org/docs/Regulating_Organic.pdf

[47] Dairy Symposium transcripts, April 18, 2006. http://www.ams.usda.gov/nosb/transcripts/transcripts.html

Danish to English provided by Torben W. Bennedsgaard, DVM, PhD with the Danish Institute of Agricultural Science.)

The EU regulations contain the following information on pasture:[48]

> 4.7. Rearing systems for herbivores are to be based on **maximum** use of pasturage according to the availability of pastures in the different periods of the year.
>
> 8.3.1. Subject to the provisions in paragraph 5.3., all mammals must have access to pasturage or an open-air exercise area or an open-air run which may be partially covered, and they must be able to use those areas whenever the physiological condition of the animal, the weather condition and the state of the ground permit, unless there are Community or national requirements relating to specific animal health problems that prevent this. **Herbivores must have access to pasturage whenever conditions allow.**
>
> 8.3.4. By way of derogation from paragraph 8.3.1., the **final fattening phase of cattle pigs and sheep for meat production** may take place indoors, provided that this indoors period does not exceed one fifth of their lifetime and in any case **for a maximum period of three months.**
>
> Annex VII: Maximum number of animal per ha (hectare) is 2 for dairy cows (.8/cows per acre). This is based on maximum number of animal per ha equivalent to 170kg N/ha/year. (Stocking density is based on manure produced.)

While other countries can be looked to for guidance and information on organic food production, ultimately, it is the responsibility of the NOP to define terms and methods of production that are appropriate to this country and uphold the intent of OFPA. In terms of pasture requirements for organic dairy production, the NOP is obligated to "ensure an organic production system that provides a living condition that allows the animal to satisfy their natural behavior patterns, provides preventative health care benefits and answers the consumer expectation of humane animal care." [49]

Thank you.

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[48] Council regulation (EEC) No 2092/91. Office for Official Publications of the European Communities, pp. 24-28, 92-93.

[49] http://www.ams.usda.gov/nosb/lscommRMR/recommendations/pasture.html

Appendix: Studies on the Economics of Pasture Based versus Non-pasture Based Systems

1. Butler, L.J. and Gerry Cohn. 1993. "The Economics of New Technologies in Dairying: BGH vs. Rotational Grazing," in William C. Liebhardt (ed.), *The Dairy Debate: Consequences of Bovine Growth Hormone and Rotational Grazing Technologies* (pp. 189-246). Davis, CA: University of California Sustainable Agriculture Research and Education Program.
The authors compare the hypothetical profitability of two dairy technologies, BGH and MIRG. The main point is that in the former, gross revenues rise as do costs, while in the latter milk production falls but so do costs. On a per-cow basis, net revenue is shown to be the same, but on a per-cwt. basis MIRG has a $0.44 advantage. They also explore the effects of changes in milk prices, milk production, interest rates, feed costs, and government policies on the profitability of the two systems.

2. Carr, S.B., et al. 1994. "Results of Intensive, Rotational Grazing on a Virginia Dairy Farm." *Journal of Dairy Science* 77(11):3478.
This is an abstract from an ADSA meeting. A dairy farm converted to MIRG. Daily milk production and milk fat content both fell. Herd health increased. Cost of purchased feeds fell by more than half. Net cash income increased by 43%. Even more impressively, net income minus depreciation increased by 70%, and net income adjusted for inventory changes increased by 227%.

3. Conneman, George, et al. 1997. "Dairy Farms Business Summary: Intensive Grazing Farms New York 1996." Cornell University. Ithaca, NY.
A basic comparison of the profitability and the factors that seem to affect it for 30 grazing farms in NY. Factors investigated include percentage of forage coming from pasture, grain fed to cows, and frequency of rotations. Operating cost per cwt. was slightly lower on grazing farms than non-grazing ($11.29 vs. $11.84). Net farm income was much higher on grazing farms ($31,876 vs. $24,607). Report contains extensive data tables.

4. Conneman, George, et al. 1998. "Dairy Farms Business Summary: Intensive Grazing Farms New York 1997." Cornell University. Ithaca, NY.
Identical in form to study #18, but updated for 1998. Economic analysis is carried out on 35 grazing farms in NY. Operating cost per cwt. was slightly lower on grazing farms than non-grazing ($11.08 vs. $11.90). Net farm income was much higher on grazing farms ($19,705 vs. $9,502). Report contains extensive data tables.

5. Conneman, George, et al. 1999. "Dairy Farms Business Summary: Intensive Grazing Farms New York 1998." Cornell University. Ithaca, NY.
A continuation of reports #18 & 19, now updated for 1999. Economic analysis is carried out on 31 grazing farms in NY. Operating cost per cwt. was slightly lower on grazing farms than non-grazing ($10.53 vs. $11.26). Net farm income was much higher on grazing farms ($58,373 vs. $45,390). Report contains extensive data tables.

6. Conneman, George, et al. 2000. "Dairy Farms Business Summary: Intensive Grazing Farms New York 1999." Cornell University. Ithaca, NY.
A continuation of reports #18, 19, & 20, now updated for 2000. Operating cost per cwt. was slightly lower on grazing farms than non-grazing ($10.53 vs. $10.73). Net farm income was lower on grazing farms for the first time in four years ($42,858 vs. $43,135). Report contains extensive data tables.

7. Hoard's Dairyman. 2003. "Save Money by Grazing Your Heifers." *Hoard's Dairyman* 148(3):96.
144 dairy heifers were split into two grazing groups and two feedlot groups. Grazing heifers gained slightly more weight. More significantly, total costs for grazing heifers was $0.95 per cow per day, versus $1.49 for feedlot heifers - an advantage of $0.54 per head per day.

8. Dartt, Barbara and James Lloyd. 1998. *A Comparison of Management-Intensive Grazing and Conventionally Managed Michigan Dairies: Profitability, Economic Efficiencies, Quality of Life, and Management Priorities.* Unpublished thesis. Department of Agricultural Economics, Michigan State University. East Lansing, MI.
This study compared 18 conventional dairies to 35 MIRG farms through surveys. Though asset levels were similar, grazing farms were 7% more profitable and 11% more capital efficient. Furthermore, grazing farms were 26% more "operating efficient" and 32% more "labor efficient." Both groups indicated a similar satisfaction with quality of life, though it was found that spouses from grazing farms took a more active role in the farm.

9. Dartt, B.A., et al. 1999. "A comparison of profitability and economic efficiencies between management-intensive grazing and conventionally managed dairies in Michigan." *Journal of Dairy Science* 82:2412-2420.
A comparison of 35 grazing and 18 conventional dairies in MI. Grazing dairies proved to be more profitable than conventional dairies, exhibiting superior asset use, operational practices, and labor efficiencies. However, the confined geographic region of this study makes extrapolation to other regions very tenuous.

10. Emmick, Darrell L. and Letitia F. Toomer. 1991. "The Economic Impact of Intensive Grazing Management on Fifteen Dairy Farms in New York State." *Forage and Grassland Conference.* American Forage and Grassland Council.
Based on a study initiated by the Soil Conservation Service in 1989 of fifteen dairy farms in New York, the authors conclude that a more intensive use of pasture on many New York dairy farms could reduce input costs and enhance overall profitability, with the exception of large dairy operations or farms where there is an insufficient amount of pasture. On average, farms in the study which had switched to grazing saved $153 per cow per year compared to their operations prior to conversion.

11. Ford, Steve. 1996. "Grazing Looks Better as Dairy Profits Tighten." *Farm Economics.* Cooperative Extension, Pennsylvania State University College of Agricultural Sciences. University Park, PA.
Writing at a time of depressed prices for dairy farmers, the author argues that as feed costs increase and milk prices decline, grazing is a more and more attractive option. He cites several

bits of data to illustrate the advantage of grazing, including 1) daily ration costs of confinement vs. grazing as grain prices rise and 2) breakeven yields for alfalfa and corn relative to grass pasture.

12. Gloy, B.A., L.W. Tauer and W. Knoblauch. 2002. "Profitability of Grazing Versus Mechanical Forage Harvesting on New York Dairy Farms." *Journal of Dairy Science* 85:2215-2222.
Financial data from 237 non-grazing and 57 grazing farms in NY were compared using a regression analysis. Profitability between and between the two systems ranged widely and overlapped, though in general grazing systems were shown to be at least as profitable as non-grazing systems. Three factors have the strongest impact on profitability for graziers: herd size, milk production per cow, and milk prices.

13. Hanson, Gregory D. 1995. "Adoption of Intensive Grazing Systems." *Journal of Extension* 33(4).
Production and financial data were obtained from a random stratified sample of 50 grazing farmers in PA. One interesting finding was that these farms were actually practicing moderate intensive grazing, not fully intensive grazing. Because of reduced costs, net returns to grazing were more than double those to a corn silage system and more than six times those to a hay operation. The article concludes by discussing the challenges facing Extension agents in disseminating grazing information to farmers.

14. Hanson, Gregory D., et al. 1998. "Profitability of Moderate Intensive Grazing of Dairy Cows in the Northeast." *Journal of Dairy Science* 81:821-829.
Grazing dairies were compared to non- or partially-grazing dairies through USDA survey data. Though non-grazing dairies showed much higher gross farm incomes, grazing dairies showed higher returns per cow and net farm income, using fewer cows. Results of a survey of 50 PA graziers are also discussed.

15. Kliebenstein, James B., Carrol L. Kirtley and Lloyd A. Selby. 1983. "A Survey of Swine Production Health Problems a. Kliebenstein, James B., Carrol L. Kirtley and Lloyd A. Selby. 1983. "A Survey of Swine Production Health Problems and Health Maintenance Expenditures." *Preventive Veterinary Medicine* 1(4):357-369.
170 pork producers in MO reported disease and death information in a 1978-79 survey. Looking at expenditures for veterinary services, the pasture producers had the lowest overall costs. The average veterinary cost per animals for pastured pigs was less than half the average cost for confined pigs.

16. Kola, Glenn, et al. 1992. "Utilizing Controlled Grazing on Dairy Farms in Northern Michigan." *Forage and Grassland Conference.* American Forage and Grassland Council.
The authors report on the reduction in production costs of four farms in Northern Michigan that converted from conventional methods to controlled grazing. The range of savings on the four farms was $8200-15,000 in real dollars. Average savings across all four farms was $2/cwt. The text also mentions briefly the social and emotional benefits of controlled grazing for the farm family.

17. Kiel, Thomas. 2000. "Wisconsin Grazing Dairy Profitability Analysis: Preliminary Fourth Year Summary." University of Wisconsin Center for Dairy Profitability. Madison, WI.
45 graziers in WI provided financial data, and comparisons are made between graziers and confinement operations. It is found that MIRG is an economically competitive system, that it is more economically flexible than a confinement system, and that it is not necessarily a reduced management system, but rather a different management system.

18. Kiel, Thomas. 2001. "Wisconsin Grazing Dairy Profitability Analysis: Preliminary Fifth Year Summary." University of Wisconsin Center for Dairy Profitability. Madison, WI.
This report is a continuation of a longitudinal study (see #33), with a fifth year of data added. Again 45 grazing farms provided financial data. The conclusions drawn the year before are merely strengthened here: MIRG is an economically competitive and flexible system. It is also found that, on the whole, graziers have higher net income per cow and lower debt per cow than confinement farms.

19. Kriegl, Thomas. 2002. "Fact Sheet #5: Grazing vs. Confinement Farms." Regional Multi-State Interpretation of Small Farm Financial Data from the First Year Report on 2000 Great Lakes Grazing Network Grazing Dairy Data. University of Wisconsin Center for Dairy Profitability. Madison, WI.
This is a factsheet based on a larger report (study #3) that specifically points out the comparisons between graziers and confinement dairies in WI and NY. Net incomes per cow for grazier vs. confinement are $617 vs. $296 in WI and $315 vs. $181 in NY. Net incomes per cwt. are: $3.44 vs. $1.20 in WI and $1.38 vs. $0.65 in NY.

20. Kriegl, Thomas. 2004. "Fact Sheet #5: Grazing vs. Confinement Farms - Year 3." Regional Multi-State Interpretation of Small Farm Financial Data from the Third Year Report on 2002 Great Lakes Grazing Network Grazing Dairy Data. University of Wisconsin Center for Dairy Profitability. Madison, WI.
This is a factsheet based on a larger report (study #4) that specifically points out the comparisons between graziers and confinement dairies in WI and NY. Net incomes per cow for grazier vs. confinement are $651 vs. $641 in WI and $786 vs. $672 in NY. Net incomes per cwt. are $3.14 vs. $2.36 in WI and $2.86 vs. $2.34 in NY.

21. Kriegl, Thomas and Gary Frank. 2004. "An Eight Year Economic Look at Wisconsin Dairy Systems." University of Wisconsin Center for Dairy Profitability. Madison, WI.
Based on eight years of data, this is a comparison of net income per cwt. for three kinds of WI dairy farms: grazing, traditional confinement (50-75 cows), and large modern confinement (>250 cows). Under three different cost scenarios, MIRG farms consistently show the highest net incomes. When all operating costs are taken into account, grazing returned an average of $3.96/cwt. over 8 years; traditional confinement $2.39/cwt.; and large modern confinement $1.50/cwt.

22. Liebhardt, William C. 1993. "Farmer Experience with Rotational Grazing: A Case Study Approach," in William C. Liebhardt (ed.), *The Dairy Debate: Consequences of Bovine Growth Hormone and Rotational Grazing Technologies* (pp. 131-188). Davis, CA: University of California Sustainable Agriculture Research and Education Program.

The author presents in exhaustive detail the results of 12 case studies of dairy farms from 5 different states, plus the results of several other academic studies. Time after time, with tables of data to illustrate, the same theme is presented: feed costs are lower, labor demands are lower, milk production is sometimes lower, and profit is higher on grazing dairies than on confinement dairies.

23. Moore, K. C. and J. R. Gerrish. 1995. "Economics of Grazing Systems Versus Row Crop Enterprises." *Forage and Grassland Conference.* American Forage and Grassland Council.
The authors state that research in Missouri and Iowa has shown that net returns can be substantially improved under rotational grazing, and income will more than cover the costs of developing the necessary infrastructure, especially on erosive marginal land with poor crop yields. Using enterprise budgets, they compare the economics of beef production across a 3-year average for 3 intensities of grazing: 3-, 12-, and 24-paddock systems. Returns above cost per acre are $77, $104, and $109, respectively.

24. Mowrey, Coleen M., Carl E. Polan and Gordon E. Groover. 2000. "Can Grazing be Profitable?" *Hoard's Dairyman* 145(16):627.
The authors relate the results of five different studies in NY, PA, WI, and VA, each of which illustrates the same general phenomenon: despite lowered milk yields and lower gross incomes, grazing farms consistently bring higher profits per cow or higher returns to labor due to reduced input and labor costs. Even when grazing farms brought lower net incomes, they still brought greater returns to labor due to smaller assets.

25. Murphy, William M. and John R. Kunkel. 1993. "Sustainable Agriculture: Controlled Grazing vs. Confinement Feeding of Dairy Cows," in William C. Liebhardt (ed.), *The Dairy Debate: Consequences of Bovine Growth Hormone and Rotational Grazing Technologies* (pp. 113-130). Davis, CA: University of California Sustainable Agriculture Research and Education Program.
This chapter lays out three main criteria for "sustainable agriculture" -- profitability, quality of life, and positive rural landscape -- and then argues that MIRG satisfies the criteria better than confinement dairying. Topics are illustrated with case studies, and include: increased profitability, lowered costs and labor requirements, better herd health, higher quality of life for the farmer, reduced erosion on farmland, and more farmers farming.

26. Murphy, William M., John R. Rice and David T. Dugdale. 1986. "Dairy farm feeding and income effects of using Voisin grazing management of permanent pastures." *American Journal of Alternative Agriculture* 1(4):147-152.
An introduction to the Voisin grazing system is given. Forage samples were taken and dairy profitability measured on six VT grazing farms. On 3 farms where comparison was possible, net profits per cow were $67 more using MIRG than using continuous grazing the year before, due mainly to savings on feed costs.

27. Nichols, Matt and Wayne Knoblauch. 1996. "Graziers and Nongraziers Fared About the Same." *Hoard's Dairyman* 141(9):351.
Selected elements of costs and profits were compared between a set of grazing and non-grazing farms in NY. When 15 graziers were matched up with 15 similar non-graziers and examined

over 3 years, milk production was consistently lower but net farm income consistently higher for graziers. When those 15 graziers were compared to a non-matched group of 79 non-graziers, both milk production and net farm income were higher for graziers.

28. Noyes, T. E., M. L. Bennette and D. J. Breech. 1997. "Economic Survey of Management Intensive Grazing Dairies in Northeast Ohio." *Forage and Grassland Conference.* American Forage and Grassland Council.
The authors find that although Ohio farms using MIRG have lower gross income than non-grazing farms, they also have a higher net income due to the savings in cost of production. Net return per cow on MIRG farms was $447 and $468 for 1994 and 1995, respectively. By comparison, net return per cow for all dairy farms (including MIRG) was $400 and $429.

29. Olsen, Jim. 2004. "A Summary of Basic Costs and Their Impact on Confinement vs. Managed Intensive Rotational Grazing (MIRG)." Wisconsin Dairy Data. University of Wisconsin Center for Dairy Profitability. No. 2004-01. Madison, WI.
3 years of data on costs of production are compared between confinement and MIRG farms. MIRG farms featured significant cost savings in a number of categories, including Renting/Leasing ($87/head/yr); Other Livestock Expenses ($82/hd/yr); Depreciation of Purchased Breeding Livestock ($65/hd/yr); Purchased Feed Costs ($45/hd/yr); and Veterinary Expenses ($43/hd/yr). Overall, the MIRG farms held a $476/head/yr advantage in costs of production.

30. Rust, J.W., et al. 1995. "Intensive Rotational Grazing for Dairy Cattle Feeding." *American Journal of Alternative Agriculture* 10(4):147-151.
Two groups of cows were either grazed (+ small supplementation) or confined over 2 years. Measurements of animal performance, forage quality, and profitability were taken. Confinement cows produced 7% more milk. Grazed cows produced a net return $53 and $44 greater than confinement cows in the 2 different years. Greatest cost economies resulted from reduced use of facilities and equipment and reduced labor.

31. Soriano, F.D., C.E. Polan and C.N. Miller. 2001. "Supplementing Pasture to Lactating Holsteins Fed a Total Mixed Ration Diet." *Journal of Dairy Science* 84:2460-2468.
Cows were fed either TMR only, TMR+morning pasture, or TMR+afternoon pasture. Milk production was slightly higher with TMR cows. No significant differences were detected for milk fat, protein content, or body weight, but body condition was greater for TMR cows. Income-over-feed costs were 18.6% higher than TMR for afternoon grazing and 7.5% higher than TMR for morning grazing.

32. White, S.L., et al. 2002. "Milk Production and Economic Measures in Confinement or Pasture Systems Using Seasonally Calved Holstein and Jersey cows." *Journal of Dairy Science* 85:95-104.
A four-year study comparing milk production and economic profitability of confinement and pastured herds. Pastured cows produced 11% less milk, but feed costs for pastured herds averaged $0.95 less per cow per day. Significantly more confinement cows got mastitis and were culled. Overall, the tradeoff between milk yields and economic factors showed pasture-based systems to be economically competitive with confinement systems.

33. Winsten, Jon, et al. 1995. "Economics of Feeding Dairy Cows on Well-Managed Pastures." University of Vermont. http://pss.uvm.edu/vtcrops/?Page=research/pasture/Economics.html.
23 VT graziers in 1994 and 21 in 1995 were compared to 24 VT confinement farms which comprised the top quarter for per-cow profitability of farms using the Agrifax accounting system. Graziers earned $579 net income per cow over 2 years, while confinement farms averaged $451 per cow. Biggest savings occurred in the areas of paid labor, cropping costs, repairs, and fuel.

34. Winsten, Jonathan R., Robert L. Parsons and Gregory D. Hanson. 2000. "A Profitability Analysis of Dairy Feeding Systems in the Northeast." *Agricultural and Resource Economics Review* 29(2):220-228.
Data was obtained from a stratified random sample of 96 dairy farms in three categories: confinement, traditional grazing, and MIRG. Confinement farms had the highest milk production and milk sales, but also the highest grain expenses and veterinary expenses per cow. There were no significant differences in machinery use. Overall, confinement farms had the highest rate of return to assets (7.76%), followed by MIRG (5.83%). Traditional grazing lagged far behind.

35. Winsten, Jonathan R. and Bryan T. Petrucci. 2003. "Seasonal Dairy Grazing: A Viable Alternative for the 21st Century." American Farmland Trust.
The report begins by providing a good introduction to the many purported benefits of grazing, including environmental, farm labor, and farm profitability. Then case studies of six farms in four states (WI, MA, MI, PA) are presented, concentrating on farmers' histories with grazing, paddock construction, feeding practices, yields, and profitability. The farms usually achieve net incomes per unit well above their state averages, even when herd size or milk per cow is substantially lower than average.

36. Zartman, D.L. (ed.). 1994. "Intensive Grazing/Seasonal Dairying: The Mahoning County Dairy Program." Department of Dairy Science, Ohio Agricultural Research and Development Center. OARDC Research Bulletin 1190. Wooster, OH.
This is an exhaustive report on many elements of a 5-year grazing project conducted to assess the viability of MIRG for Ohio dairies. Consists of 12 chapters, mostly agronomy- and animal science-related. Milk production increased each year. Costs of production were found to be 27-30% below those used in conventional OH dairy budgets. Net farm income was also higher than the national dairy farm average in the year when the project sold Grade A milk.