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Feeding strategies on certified organic dairy farms in Wisconsin and their effect on milk production and income over feed costs

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ABSTRACT

The purposes of this study were (1) to analyze and categorize certified organic Wisconsin dairy farms based on general farm characteristics and feeding strategies during the course of 2010, and (2) to evaluate herd milk production and income over feed costs (IOFC). An on-site survey containing sections on farm demographics, feeding, grazing, and economics was conducted on 69 farms (12.6% survey response rate). A nonhierarchical clustering method using 9 variables related to general farm characteristics, feed supplementation, and grazing was applied to partition the farms into clusters. A scree plot was used to determine the most appropriate number of clusters. Dry matter intake was approximated based on farmer-reported total amounts of feed consumed (feed offered less refusals). Milk production was evaluated using reported milk rolling herd averages (RHA). Income over feed costs was calculated as milk sales minus feed expenses. The farms in clusters 1 (n = 8) and 3 (n = 32), the large and small high-input farms, respectively, included more feed ingredients in their lactating cow diets and relied more heavily on concentrates than farms in other clusters. Cows on these farms were predominantly Holstein. Clusters 1 and 3 had the highest RHA (6,878 and 7,457 kg/cow per year, respectively) and IOFC ($10.17 and $8.59/lactating cow per day, respectively). The farms in cluster 2 (n = 5) were completely seasonal, extremely low-input farms that relied much more heavily on pasture as a source of feed, with 4 out of the 5 farms having all of their operated land in pasture. Farms in cluster 2 relied on fewer feeds during both the grazing and nongrazing seasons compared with farms in the other clusters. These farms had the lowest RHA and IOFC at 3,632 kg/cow per year and $5.76/lactating cow per day, respectively. Cluster 4 (n = 24), the partly seasonal, moderate-input, pasture-based cluster, ranked third for RHA and IOFC (5,417 kg/cow per year and $5.92/lactating cow per day, respectively). Breeds other than Holstein were used more prevalently on farms in clusters 2 and 4. Results indicated extreme variation in animal breed, structure, and feeding strategies among Wisconsin organic dairy farms. Feeding strategies appeared to be major determinants of RHA and IOFC. These findings may serve current organic and transition farmers when considering feeding management changes needed to meet organic pasture rule requirements or dealing with dietary supplementation challenges.
Key words: organic dairy, feed supplementation, cluster analysis

INTRODUCTION

Feeding management on organic dairy farms has become an increasingly critical and complex task. In the United States during 2010, feed costs accounted for approximately 50% of total costs for producing milk (USDA-NASS, 2012). Furthermore, on June 17, 2010, the USDA National Organic Program finalized a pasture rule for organic ruminants (USDA-AMS, 2010). Organic dairy cattle of at least 6 mo of age must receive 30% or more of their DMI from pasture during the yearly grazing season, which must be at least 120 d long. Compliance with the pasture rule can create challenges for organic famers when balancing dairy rations. Harsh winters, limited land bases, drought, and many other factors prevent complete reliance on pasture for Wisconsin dairy cattle, requiring farmers to find additional feed sources for all or part of the year. Rising grain prices, limited and expensive harvested forages due to recent droughts (USDA-ERS, 2013), and the requirement that 100% certified organic feed must be fed to livestock have put extreme constraints on nonpasture feeding on certified organic dairy farms (USDA-AMS, 2013). Organic farming in the United States is further defined by its promotion of cultural and biological practices such as biodiversity, cycling of resources, and prohibition of use of synthetic fertilizers, herbicides, pesticides, antimicrobials, reproductive drugs, and genetically modified organisms (USDA-AMS, 2013).

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Wisconsin's prominent role in the nation's organic dairy industry makes it an important and necessary place to study this growing dairy sector. With 22% of the nation's total, Wisconsin ranks first in the United States for the total number of certified organic dairy farms (USDA-NASS, 2012). Conclusions drawn about Wisconsin's organic dairy farms could apply to similar farms in the northeastern United States because Wisconsin's organic farms are similar in size and structure to those located in the Northeast (McBride and Greene, 2009).

Although research on certified organic dairy farming in the United States is increasing, especially with comparisons to conventional farming (Zwald et al., 2004; Sato et al., 2005; Pol and Ruegg, 2007; Stiglbauer et al., 2013), few sources have focused on certified organic dairy farming alone. Furthermore, limited studies have focused on the relationship between feeding management, production performance, and profitability (McBride and Greene 2009; Hoshide et al., 2011; Marston et al., 2011). Thus, the purposes of this study were (1) to analyze and categorize certified organic Wisconsin dairy farms based on general farm characteristics and feeding strategies during the 2010 production year, and (2) to evaluate herd milk production and income over feed costs (**IOFC**).

MATERIALS AND METHODS

Sampling

To establish the sampling frame, 2 separate directories, the 2009 Wisconsin Active Dairy Producers list and the Wisconsin Certified Organic Producers list, were obtained from Wisconsin's Department of Agriculture, Trade and Consumer Protection (WDATCP, 2010). The first directory included all Wisconsin farms that sold milk in 2009. The second directory was a list of all Wisconsin farms that were certified organic in 2010, which included dairy, meat, and vegetable farms. The 2 lists were compared to create a list of Wisconsin organic dairy producers; names that appeared in both directories were assumed to be certified organic dairy producers in Wisconsin (n = 554). All farmers on the resulting list were invited to participate in the study through a direct mailing that included an introductory letter, project summary, description of the project team members, and a prestamped postcard to be returned to the project team indicating level of interest in project participation. Farmers were also informed of a $100 honorarium to be paid upon completion of the survey. Producers willing to participate were contacted by phone or mail to schedule an on-farm, face-to-face visit for survey administration. Farms (n = 70) were surveyed between January 2011 and January 2012 regarding the 2010 production year.

Survey Protocol

The survey instrument (available at http://DairyMGT.info/Survey.pdf) was 45 pages long and contained 98 questions and 46 tables to be completed within 9 general sections. The instrument was tested on 3 pilot farms before its use for research data collection. The instrument, consent form, and study protocol were approved by the University of Wisconsin-Madison Institutional Review Board (SE-2009-0401). Selected data from 7 sections of the survey were used in this study. The first portion of the survey focused on farm demographics—land operated and characteristics of the dairy herd. Additionally, the amount of milk sold, component figures, and milk price were obtained from milk check stubs for each month of 2010. The middle sections of the survey focused on feed ingredient supplementation and grazing management practices. Farmers were asked to divide their herds into specific cow feeding groups (if applicable) and assess feed ingredient types and amounts consumed for all groups on a month-by-month basis. The final portion of the survey assessed cropping strategies, homegrown feed costs, and other economic variables.

Calculations

Lactating cow DM consumption (kg/cow per day) year round was approximated based on farmer-reported total amounts of feed consumed (feed offered less refusals) during the nongrazing-season months. Farmers who fed TMR or partial TMR obtained these values from feed sheets. Farmers who fed ingredients separately commonly obtained forage weights from harvest equipment and grain weights from feed mill slips. The difference between the approximated total daily DM consumed and the amount of feed supplements (all nonpasture feed) consumed during the grazing season was assumed to be DM consumed from pasture (pasture DM consumed = total approximated DM consumed – DM consumed from feed supplements during the grazing season), as outlined in Gehman et al. (2006) and Rego et al. (2008).

In this study, income referred specifically to revenue generated from milk sales. Feed costs were for lactating cows only and included expenses related to purchased feeds, homegrown feeds, and a calculated grazing cost. Cost estimates of the latter 2 items included seed, fertilizer, weed and pest control, and irrigation costs. Custom harvesting and labor, storage, and transportation costs were also included in feed costs for farms