J. Dairy Sci. 99:1–10
http://dx.doi.org/10.3168/jds.2015-10193

Management practices on organic and conventional dairy herds in Minnesota

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ABSTRACT

The objective of this study was to describe and compare husbandry practices on organic and conventional dairy farms of similar sizes in Minnesota. Organic (ORG, n = 35), same-sized conventional (SC, n = 15, <200 cows) and medium-sized conventional (MC, n = 13, ≥200 cows) dairy herds were visited in 2012, and farmers were interviewed once about their farm, herd demographics, and herd management practices concerning nutrition, housing, and reproductive programs. Organic farms had been established as long as conventional farms, and ORG producers had most commonly selected ORG farming because of a negative perception of pesticides for human health. The distribution of cattle breeds and ages differed across farm types. Organic farms had more crossbred cows and a greater number of older cows than conventional farms, who had mainly Holstein cattle. Organic farms did not dock tails, were more likely to use breeding bulls, and were less likely to conduct pregnancy diagnoses in cattle. All conventional farmers fed corn, corn silage, and hay, but no forage or feed supplement was fed by all ORG farms with the exception of pasture. Kelp was supplemented on most ORG farms but on none of the conventional farms. In summary, although there were differences across farm types regarding the use of pasture, feeds, and feed additives, breed and age distribution, reproductive management, and the use of tail docking, observations in other management areas showed large overlap across herd types.
Key words: organic, dairy, cattle, husbandry

INTRODUCTION

Over the past decade, the demand for organically produced food has increased tremendously in the United States. In particular, the dairy sector, which represents the second largest segment of the organic (**ORG**) agricultural industry, has grown exponentially (ERS, 2014). In the United States, the National Organic Program (**NOP**) of the USDA's Agricultural Marketing Service defines the rules under which farmers produce organic products or livestock (AMS, 2015). All certified organic livestock must be fed organic feed, and all ruminants over 6 mo of age are required to receive at least 30% of their annual DMI from pasture for at least 120 d during the grazing season. This definition of feed intake and pasture access is known as "the pasture rule."

Use of hormones (with the exception of oxytocin) and antibiotics is prohibited in ORG livestock production. Any animal treated with antibiotics or any other substance not specified in the NOP rules loses its organic status. A treated animal must immediately leave the organic farm, and none of its milk or meat products can ever be sold as organic. However, the NOP rules also explicitly state that effective treatment (e.g., antibiotics) must not be withheld from a sick animal to retain its organic status (AMS, 2015). Therefore, preventative management practices have been identified as the cornerstone of ORG farming.

Little is known about general management practices or health parameters on ORG farms in the United States (McBride and Greene, 2007; Rotz et al., 2007; Richert et al., 2013; Stiglbauer et al., 2013). Some of the existing studies were conducted before the pasture rule was introduced in 2010 (McBride and Greene, 2007; Rotz et al., 2007), and many other studies of organic dairy production are from Europe (Cabaret, 2003; Vaarst et al., 2005; Fall et al., 2008; Haskell et al., 2009; Ivemeyer et al., 2009; Sundberg et al., 2009; Garmo et al., 2010), which operates under different organic rules than those set in the United States. For instance, current European law does not mandate DMI from pasture for ruminants, and European (European Union, 2007) as well as Canadian standards (COS, 2011) allow the use of antibiotics or parasiticides with extended withhold times for the treatment of sick animals. As such, a comparison of ORG dairy herds in Europe and the United States should be done cautiously.

Received July 31, 2015.
Accepted December 12, 2015.
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In response to the scarcity of information comparing these 2 production systems, the objective of this study was to describe and compare husbandry practices on organic and conventional farms in Minnesota.

MATERIALS AND METHODS

The study was conducted between June and November 2012 in Minnesota. All certified ORG dairy herds in Minnesota (n = 114) and a convenience sample of conventional herds that were enrolled in the Minnesota DHIA and that raised their heifers on site were invited to participate. Conventional herds were selected to be of similar geographic region as the ORG herds, the approximate same herd size and ideally allowed pasture-access to their animals. Each herd was visited once, and a questionnaire was administered directly to the producer by one of the researchers (L. J. W., S. S., L. M., and U. S. S.). This questionnaire was largely based on 3 National Animal Health Monitoring Service (**NAHMS**) questionnaires (2007 General Dairy Management Report, 2007 VS Initial, and VS Second Visit surveys). The survey asked about herd descriptors involving age and breed distribution, other species on farm, and production parameters, and it asked about management practices concerning housing, feeding, and reproductive management, as used on the farms over the previous 12 mo. In addition, the environment and waterers were assessed for hygiene (scale 1–3). Environmental hygiene scores were as follows: 1 = vast majority of bedding clean and dry, with minimal visible manure; 2 = majority of bedding clean, but some fecal contamination was visible; 3 = majority of bedding was covered in manure. For waterers, the hygiene scores were as follows: 1 = minimal to no water contamination, bottom of trough clean, 2 = clean to minimally contaminated water, bottom had debris; 3 = water is dirty and bottom of trough not visible. The complete survey can be found here: https://web-cvm.s3.amazonaws.com/dairy/assets/File/Organic%20survey.pdf. The study and survey protocol were approved by the University of Minnesota's Institutional Animal Care and Use Committee.

The conventional herds varied greatly in size. To allow comparison with the ORG herds, therefore, they were split into small conventional herds (**SC**, <200 mature cows total, i.e., milking and dry cows) and medium-sized conventional herds (**MC**, ≥200 mature cows total). The other herds were categorized by size so that SC and ORG herds were of comparable herd size and larger herds were included in the medium-size category similar to the NAHMS surveys (USDA-NAHMS, 2007). Three conventional herds with more than 500 cows (562, 574, and 811 mature cows in total, respectively) were also included in the medium herd size.

Survey data were described with summary statistics including medians and interquartile ranges (**IQR**, reported as 25th to 75th percentiles) for continuous data, and with frequency statistics for categorical data. Nonparametric tests (Fisher's exact, Kruskal-Wallis, and Mann-Whitney U-tests) were used to compare observations between or among herd types (ORG, SC, MC) and Spearman correlations were used to assess relationships between continuous or assumed continuous (e.g., percent) variables. All data were analyzed using SAS 9.4 (SAS Institute Inc., Cary, NC), with significance level set at $\alpha = 0.05$.

RESULTS

In total, 35 ORG farms, 15 SC farms, and 13 MC farms participated in the survey. Most ORG farms (69%) were DHIA members, whereas all conventional farms were DHIA members. Table 1 summarizes descriptors of the 3 farm types. The median year that a farm was established did not differ between types ($P = 0.70$), and the median time that participants had been farming did not differ either ($P = 0.95$). As expected, more people worked on MC farms compared with smaller SC and ORG farms. Numbers of cattle (both mature and youngstock) per worker were 42.3 cows/worker on ORG farms, 43.5 cows/worker on SC farms, and 66.4 cows/worker on MC farms ($P < 0.01$).

Organic farms had been organically certified for an average of 8 yr (certification year range: 1990–2012), and most (70%) ORG producers stated that they had been farming with organic practices before being officially certified. Producers could state multiple reasons for the pursuit of organic certification and identified the general dislike of chemicals used in agriculture (n = 21), which included the effect of pesticides and herbicides on their personal or human health (n = 9), economic reasons (n = 12), a perceived benefit for the environment and soil (n = 7), benefits for the cows (n = 5), a preferred lifestyle choice, ethical reasons (n = 5), and peer pressure (n = 1).

Herd sizes on the surveyed farms of all types increased over the previous 10 yr (Table 1). Approximately half of the producers (ORG: 48.6%, SC: 40.0%, MC: 38.5%; $P = 0.83$) had indicated that they had purchased cattle in the previous 12 mo. In general, the type of cattle purchased did not differ between herd types, but conventional herds tended to be more likely to bring mature cows on site compared with ORG herds ($P = 0.06$).