J. Dairy Sci. 101:1–9
https://doi.org/10.3168/jds.2017-13315

Is the profitability of Canadian freestall farms associated with their performance on an animal welfare assessment?

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ABSTRACT

Improving animal welfare on farm can sometimes require substantial financial investments. The Canadian dairy industry recently updated their Code of Practice for the care of dairy animals and created a mandatory on-farm animal care assessment (proAction Animal Care). Motivating dairy farmers to follow the recommendations of the Code of Practice and successfully meet the targets of the on-farm assessment can be enhanced by financial gain associated with improved animal welfare. The aim of the current study was to evaluate the association between meeting or not meeting several criteria from an on-farm animal welfare assessment and the farms' productivity and profitability indicators. Data from 130 freestall farms (20 using automatic milking systems) were used to calculate the results of the animal care assessment. Productivity and profitability indicators, including milk production, somatic cell count, reproduction, and longevity, were retrieved from the regional dairy herd improvement association databases. Economical margins over replacement costs were also calculated. Univariable and multivariable linear regression models were used to evaluate the associations between welfare and productivity and profitability indicators. The proportion of automatic milking system farms that met the proAction criterion for hock lesions was higher compared with parlor farms and lower for the neck lesion criterion. The proAction criterion for lameness prevalence was significantly associated with average corrected milk production per year. Average days in milk (DIM) at first breeding acted as an effect modifier for this association, resulting in a steeper increase of milk production in farms that met the criterion with increasing average DIM at first breeding. The reproduction and longevity indicators studied were not significantly associated with meeting or not meeting the proAction criteria investigated in this study. Meeting the proAction lameness prevalence parameter was associated with an increased profitability margin per cow over replacement cost by $236 compared with farms that did not. These results suggest that associations are present between meeting the lameness prevalence benchmark of the Animal Care proAction Initiative and freestall farms' productivity and profitability. Overall, meeting the animal-based criteria evaluated in this study was not detrimental to freestall farms' productivity and profitability.
Key words: animal welfare assessment, farm productivity, farm profitability, cow comfort

INTRODUCTION

Good animal welfare has always been an important preoccupation for dairy producers because good welfare practices can promote animal health and comfort (McInerney, 1998; De Grassi, 2001). However, over the last decades, public and consumer interest in this subject has greatly increased, leading to legislation and voluntary animal welfare standards being implemented. In addition, animal welfare assessment programs have been developed to monitor whether farms comply with these standards (Webster, 2012; Logue and Mayne, 2014). On-farm animal welfare assessments need to incorporate animal-based indicators, in addition to the typical resources-, records-, and management-based ones, to capture an accurate picture of the situation on a farm because animal welfare is multidimensional and has many different components (Rushen and de Passillé, 2009; Webster, 2012).

In North America, the US dairy industry has implemented the Farmers Assuring Responsible Management (FARM) program to monitor on-farm conditions of the animals and ensure that minimum standards are met (National Milk Producers Federation, 2016). In Cana-

Received June 11, 2017.
Accepted November 3, 2017.
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da, the Dairy Farmers of Canada association (**DFC**) has created a Code of Practice to establish standards of care for dairy animals (DFC-NFACC, 2009). Since the Canadian Code of Practice was implemented, a new producer-driven mandatory on-farm audit called the proAction Initiative has also been created. Over time, the complete assessment will cover areas including milk quality, food safety, livestock traceability, biosecurity, environment, and animal care (DFC-PLC, 2015). The Animal Care portion of the proAction program aims to measure the care, comfort, and well-being of dairy cattle on Canadian dairy farms to determine the extent to which the Canadian Code of Practice is being followed. In short, the proAction Animal Care assessment includes 20 main questions using 3 types of measures: animal-, management-, and resource/input-based, for a total of approximately 35 criteria evaluated (DFC-PLC, 2015). For each measure, a benchmark has been set to discriminate between farms that meet or do not meet the criterion (DFC-PLC, 2015). Farms that will not meet the benchmarks will have to take corrective actions to remediate the problems. The Animal Care portion of proAction Initiative is a very recent audit that is currently being tested on-farm. Therefore, the benchmark limits currently in use represent the excellence targets for the farms. A ranking system using multi-level targets and based on comparison with peers will be created once a first set of assessment has been completed (Beauchamp, 2016).

Generally, following an on-farm assessment, recommendations are formulated to help dairy producers improve the situation on their farms. In some cases, the recommendations formulated to increase the animals' well-being require financial investments to be followed. For example, if producers are required to modify their housing system, the changes needed may be very expensive. In contrast, changes to the management may be less costly and even improve financial efficiency. In the dairy industry, as in many other industries, financial investments are easier to commit to when a financial gain is expected in return. Economic principles can play an important role to improve farm animal welfare (Christensen et al., 2012). Therefore, it is important to understand the links between meeting animal welfare standards and the farms' productivity and profitability. This information could help convince dairy producers to financially invest in the improvement of their animals' welfare, even if the cost may be elevated.

Currently, little scientific information is available on the associations between freestall farms' productivity and profitability and the farms' compliance with animal welfare standards. We evaluated the potential economic effects of meeting or not meeting several criteria from the new proAction Animal Care Initiative assessment. The farms' productivity and profitability were determined based on milk production, milk quality, reproduction, animal longevity, and economic margins calculated over replacement cost. We also determined the extent to which meeting one aspect of proAction was related to meeting another aspect. This study focused on the animal-based criteria of the welfare assessment, which represent only a portion of the entire Animal Care portion of the proAction Initiative.

MATERIALS AND METHODS

The institutional animal care committees and research ethics boards of the University of Guelph (Guelph, Ontario, Canada, AUP #10R110), Université Laval (Québec, Québec, Canada, CPAUL #2010127), and University of Calgary (Calgary, Alberta, Canada, ACC #SHC10R-07) approved all procedures.

Herd and Animal Selection

Canadian freestall dairy farms, 110 with milking parlors and 20 with automatic milking systems (**AMS**), were enrolled in this part of a larger cow comfort study from the 3 highest milk producing provinces of Canada; Alberta (n = 51), Ontario (n = 50), and Québec (n = 29; Vasseur et al., 2015). Characteristics of the farms are shown in Table 1. Participation in the study was on a voluntary basis and the initial contact was made through a mailed letter (Alberta and Ontario) or a phone call by the farm's DHIA advisor (Québec). To be eligible to participate, the herds needed to have a minimum of 40 Holstein dairy cows in lactation, not provide outdoor access to their lactating animals for more than 2 h/d, and having used their current housing system for at least 1 yr. For farms using a milking parlor, farms also needed to milk twice a day and be enrolled in their regional DHIA programs (CanWest DHI, Alberta and Ontario; Valacta Inc., Québec). Other selection criteria were based on the cows' longevity, in terms of percentage of cows in third or higher lactation and replacement rate, to capture farms with low, medium, and high longevity level based on provincial averages, and mean milk production $\geq$7,000 kg per cow per year (Vasseur et al., 2015). In Alberta, the farms also needed to participate in the Alberta Hoof Health Project to be enrolled in this study (Solano et al., 2015). The selection process for the farms visited was not truly random because of the different entrance criteria for the cow comfort study. However, the final sample of farms enrolled was representative of the Canadian dairy industry based on the average number of cows, average corrected yearly milk production, and general characteristics of the farms (AAFC, 2016; PLQ, 2016).