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Dairy producers' attitudes toward reproductive management and performance on Canadian dairy farms

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ABSTRACT

The objectives of this study were to explore Canadian dairy producers' attitudes toward reproductive performance and challenges they perceive to be related to reproduction and reproductive management practices. A survey in both English and French was developed, validated, and administered to Canadian dairy farmers between March and May 2014 to collect general farm, reproduction management, and reproductive performance data, as well as opinions and perceptions about different facets of reproduction. Associations between management practices and the perceived importance of reproduction were tested using a logistic regression model. Thematic network analysis was used to identify themes from the open-ended survey questions about challenges concerning reproduction. Finally, questions that were answered on a Likert scale were graphically represented using diverging stacked bar charts. A total of 832 questionnaires were completed online and by mail, which represents approximately 7% of all dairy farms in Canada. Respondents that ranked reproduction in lactating dairy cows as 1 of the 3 most important challenges faced on their farm (66%) were more likely to house their lactating cows in a tiestall and to have a lower herd annual 21-d pregnancy rate. Estrus detection and conception risk were 2 major themes raised and discussed by the respondents. Other concepts, including housing and milk production, were also perceived to affect estrus detection and conception risk. Whereas analysis of open-ended survey questions does not allow for quantification of the importance of different themes in the sample as a whole, it does show that respondents are aware of the multifactorial complexity of reproductive challenges on dairy farms. Improving performance was the main factor influencing decisions concerning reproduction for 80% of the respondents, and they adopted tools and technologies such as synchronization programs and automated activity monitoring systems to improve herd reproductive performance. More research is required to describe how this performance is defined and perceived by the respondents, and how it relates to the actual variability of performance (i.e., pregnancy rate) among farms.
Key words: opinion, reproduction, survey, technology

INTRODUCTION

To be sustainable, dairy production must be economically profitable, result in a high-quality product, and take into account the animals, the environment and resources, and consumers (von Keyserlingk et al., 2013). Multiple tools and technologies have been developed over the past decades and adopted on dairy farms to manage reproduction and improve reproductive performance (Caraviello et al., 2006; Neves and LeBlanc, 2015; Denis-Robichaud et al., 2016). For example, automated activity monitoring (**AAM**) systems are used to detect estrus with adequate accuracy (Roelofs et al., 2005a; Løvendahl and Chagunda, 2010). The main reason for adopting AAM systems among surveyed Canadian dairy farmers in 2010 was dissatisfaction with reproductive performance (Neves and LeBlanc, 2015). The reasons for adopting timed AI programs have not been quantified, but reproductive hormones are widely used on dairy farms in North America to synchronize estrus or ovulation (Caraviello et al., 2006; Denis-Robichaud et al., 2016). Depending on the program and success of implementation relative to other reproduction management options, performance of timed AI is usually good to excellent (Nebel et al., 1994; Souza et al., 2008).

The economic impact of reproductive performance (Cabrera, 2014) makes the management of reproduction a key factor targeted by farmers and their advisors. Data that provide insights into producers' practices, perspectives, and priorities may be useful to farm advisors and may help to inform research questions in dairy science. Therefore, the objective of the current study was to describe dairy producers' attitudes toward reproductive performance and their perceptions

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of challenges related to reproduction and reproductive management practices.

MATERIALS AND METHODS

Information from a total of 832 Canadian dairy farms was collected in this cross-sectional study, using a bilingual (English and French) questionnaire reported previously [including supplemental data from Denis-Robichaud et al. (2016; http://dx.doi.org/10.3168/jds.2016-11445); University of Guelph Research Ethics Board #14JA048]. Briefly, the questionnaire was distributed across Canada from March to May 2014 by internet (FluidSurveys, Ottawa, Canada) and mail. A web link to the questionnaire was sent once to approximately 3,000 available email addresses of subscribers to the milk recording services in Canada by the DHIA organizations, without reminders or follow-up. Additionally, a printed advertisement card with the web address was sent to approximately 8,000 dairy farmers, included in The Milk Producer magazine, and included with the monthly milk recording service (DHIA) report, depending on the region. A paper copy of the questionnaire was also sent to 2,000 randomly selected milk recording subscribers with their monthly DHIA report. We did not receive any demographic data on the recipients of the email or mailed questionnaires. The estimated sampling frame reached with the 3 methods, including some overlap among the approaches, was approximately 9,000 dairy herds (11,962 dairy herds in Canada; Canadian Dairy Information Center, 2014).

In addition to the information about demographics, management practices, and reproductive performance reported previously (Denis-Robichaud et al., 2016), respondents were asked to give their opinions and perceptions of reproduction and reproductive management practices with open-ended and ranking questions, and ordinal 5-point (Likert) scale questions (e.g., for a given statement, respondents selected their degree of agreement: strongly disagree, disagree, no opinion, agree, or strongly agree). Respondents were asked to rank 9 different difficulties or challenges encountered on their farm according to its importance in their herd: lameness, calf health, mastitis, transition cow diseases, nutrition, heifer growth, reproduction of lactating dairy cows, culling rate, and reproduction of heifers.

Data entry for mail answers was done in Microsoft Access (Microsoft Corporation, Richmond, WA), and all data (mail and online) were collated into a Microsoft Excel (Microsoft Corporation) spreadsheet. Respondents were asked to give one-time access to their data from milk recording services. If they gave permission and a valid herd identification number, data on AI and pregnancy dates were entered into DairyComp 305 (VAS, Tulare, CA). Annual 21-d pregnancy rate (**PR**), 21-d insemination rate (**IR**), and conception risk (**CR**; probability of diagnosed pregnancy per AI) for the year 2013 were extracted from the software using a standardized voluntary waiting period of 50 d postpartum. This voluntary waiting period was chosen to have comparable PR, insemination rate, and conception rate among herds. From the present data, the average reported voluntary waiting period in Canada was 57 DIM (Denis-Robichaud et al., 2016).

Statistical analyses were conducted using SAS 9.3 (SAS Institute, Cary, NC). Means, medians, and interquartile ranges (**IQR**; 1st to 3rd quartile) were calculated for continuous variables, and frequencies were calculated for binary and categorical variables. Univariable logistic regression models (PROC LOGISTIC in SAS) were built to identify factors associated with classifying reproduction of lactating dairy cows in the first 3 positions of the ranking, and a multivariable model was fitted using a backward elimination approach.

A thematic networks analysis (**TNA**) approach (Attride-Stirling, 2001; O'Cathain and Thomas, 2004) was used for the open-ended question, "Concerning reproduction in general, what do you think are the main difficulties or challenges?" This approach allowed for exploration of the issues and reproductive challenges on dairy farms and visual structuring of the textual data (Attride-Stirling, 2001). The answers provided by respondents were read, and basic themes describing the thematic content were formulated. Basic themes were then grouped within common organizing themes, which were in turn grouped within global themes according to current knowledge or explicit mention by the respondents. For example, basic themes for ovarian cyst, retained placenta, purulent vaginal discharge, metritis, pregnancy loss, and abortion were grouped under the organizing theme reproductive diseases, which connected with the global theme animals. These links between basic themes, organizing themes, and global themes represent the thematic network of ideas reported by the respondents.

Answers to Likert scale questions were used as outcomes in linear regression models (PROC GLM in SAS) to identify associations between the respondent's agreement with statements concerning reproduction and their management practices and farm characteristics (Norman, 2010). Location of the herd, barn type, reproductive management practice used for >50% of AI in lactating cows, ranking of reproduction among self-assessed herd challenges, and annual herd PR were the variables offered to the regression models. These variables were chosen based on their plausible association with the models' outcome. Answers were represented graphically using diverging stacked bar charts