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## Kansas Dairy Producers' Needs Survey: Reproductive Management on Kansas Dairy Farms

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### Abstract

A section of the Kansas Dairy Producers' Needs Survey evaluated needs related to education on reproductive management and the most common reproductive management practices used on Kansas dairy farms. Of the 312 surveys mailed to dairy producers, 70 were returned fully completed. Results indicate that producers need education on the topic of reproduction and that reproductive management practices and herd sizes are related to where farms are located in the state. Consequently, future Extension reproductive management programming should reflect the diversity of Kansas's dairy industry. Moreover, the results presented align with earlier data from a nationwide survey and therefore may have applicability on a national scale.

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### Introduction

The Kansas dairy industry is extremely diverse and has gradually grown over the past 20 years (The University of Kansas Institute for Policy and Social Research, 2014). Kansas has become unique in its extreme variation in dairy farm sizes and management practices. The western portion of Kansas favors large dry-lot facilities because of dry climate conditions. In contrast, in other portions of the state, producers have traditionally chosen conventional free-stall and tie-stall facilities because of greater rainfall and humidity. Diversity among Kansas dairy farm facilities may result in a variety of reproductive management practices, which may warrant varying approaches when choosing topics for Extension programs in order to meet producers' needs. Mailed surveys can be a valuable tool for gathering information from producers, especially individuals who are not familiar with Extension programs or services (Kelsey & Mariger, 2003). Therefore, we conducted a survey that was partly intended to identify Kansas dairy producers' needs related to dairy cattle reproductive management and topics for associated Extension programs. The results are relevant to Extension programmers in Kansas; however, because they also align with earlier data from a nationwide study, we suggest that they may have applicability on a national scale.

## Methods

In November 2014, the Kansas Dairy Producers' Needs Survey was mailed to 312 Kansas dairy producers for the purpose of assessing their management practices and interest in educational programs. The Committee on Research Involving Human Subjects and Institutional Review Board for Kansas State University reviewed the survey before it was mailed to producers. Surveys were sent in hand-addressed envelopes, with each envelope containing the survey itself, a cover letter, and a return-addressed envelope. Response to the survey was voluntary and anonymous, with no reward incentive for completion. Producers were given a deadline of 45 days to return the completed survey.

Survey questions were created by our collaborating group and elicited general information about the respondent's dairy farm, including farm location, herd size, characteristics of employees, cattle reproductive management practices, and productivity traits. Furthermore, respondents were asked to provide information related to reproductive efficiency according to season (October to May and June to September). Survey responses were categorized by geographic region within the state: northeast, southeast, central, and west. This article focuses particularly on responses related to the dairy producers' needs around reproductive management practices for their cows and heifers.

## Results and Discussion

### Demographics of Respondents

A total of 81 surveys were returned, of which 70 were fully completed. The 11 uncompleted surveys indicated that the producers were no longer dairy farming; therefore, those surveys were discarded. Thus, the overall response rate of completed surveys was 22.4% (70/312).

Response rate by geographic region is detailed in Table 1. Among the 70 responses, 76% of the responses were from the northeast ( $n = 29$ ) and central ( $n = 24$ ) regions; the remaining responses were from the west ( $n = 9$ ) and southeast ( $n = 8$ ) regions. It is important to note that differences in herd size were apparent by region. In the central and southeast regions, 100% of the respondents had herd sizes of less than 250 milking cows, and in the northeast region, 75.9% of the respondents had herd sizes of less than 250 milking cows. In contrast, 77.8% of respondents in the west region had herd sizes of greater than 2,000 milking cows. These figures demonstrate the dramatic diversity in dairy herd size across Kansas's geographic regions (Table 1). Differences in herd size based on region are important to consider when interpreting the results of our survey. In addition, these differences should be acknowledged when planning Extension programs.

**Table 1.**

Geographic Distribution of Responding Kansas Dairy Producers and Herd Size Variation by Region

	Proportion of completed surveys % (no. from region/total no.	Herds with $\leq 250$ milking cows % (no./no. completed	Herds with $> 250$ milking cows % (no./no. completed
Overall response rate % (no. returned/no.			

Region	mailed)	across regions)	surveys)	surveys)
Northeast	25.9 (29/112)	41.4 (29/70)	75.9 (22/29)	24.1 (7/29)
Central	19.2 (24/125)	34.3 (24/70)	100 (24/24)	0.0 (0/24)
Southeast	19.0 (8/42)	11.4 (8/70)	100 (8/8)	0.0 (0/8)
West	27.3 (9/33)	12.9 (9/70)	22.2 (2/9)	77.8 (7/9)

## Reproductive Management

One of the questions asked in the survey was "What is the average 21-day pregnancy rate in your herd?" Producers were asked to report the 21-day pregnancy rate from October to May and from June to September. We asked this question to evaluate reproductive efficiency of Kansas dairy herds during warm and cool months of the year. Producers reported an average 21-day pregnancy rate of 29.8% from October to May and 23.7% from June to September. The wide range of rates reported by producers (2% to 90%) included many values outside the expected pregnancy rates for dairy farms. The prevalence of unreasonable values for average 21-day pregnancy rate indicates that not all producers have a clear understanding of the definition of 21-day pregnancy rate and how the value is calculated. This information should be considered when developing Extension programs related to reproduction. Using 21-day pregnancy rate as a key performance indicator is advised for monitoring efficiency of reproductive performance of dairy herds (Mendonça, 2015).

Producers were asked which topics for educational programs would most benefit them and their employees. Sixty-six percent indicated that reproduction would be a beneficial topic (Table 2). In addition, producers were asked "Which management areas do you plan to improve in the next year?" Reproduction was the management area that the highest proportion of producers planned to improve (Table 3). These results indicate that reproductive management is an important topic for Kansas dairy producers.

**Table 2.**  
Proportions of Responding Kansas Dairy Producers Interested in Various Topics for Educational Programs

Topic	Response % (no.)
Reproduction	65.7 (46)
Cow health	55.7 (39)
Milk quality	51.4 (36)
Nutrition	48.6 (34)
Calf/heifer management	47.1 (33)
Lameness	45.7 (32)
Cow comfort	44.3 (31)
Transition cow management	38.6 (27)
Waste management	24.3 (17)

Technology	21.4 (15)
Record management	21.4 (15)
Employee leadership skills	14.0 (20)

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**Table 3.**

Proportions of Responding Kansas Dairy Producers  
Desiring to Make Improvements in Specific  
Management Areas

<b>Management area</b>	<b>Response % (no.)</b>
Reproduction	52.9 (37)
Milk quality	44.3 (31)
Cow health	41.4 (29)
Cow nutrition	35.7 (25)
Waste management	34.3 (24)
Calf/heifer management	32.9 (23)
Transition cow management	32.9 (23)
Risk management	30.0 (21)
Record keeping	30.0 (21)
Employee management and training	21.4 (15)
Parlor management	21.4 (15)

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In a survey of Wisconsin dairy producers, 30.3% of producers who were planning to expand and 36.0% of producers who were not planning to expand were interested in reproductive management programs (Cabrera & Janowski, 2011). Although the overall percentages of producers interested in these programs were lower in the Wisconsin survey than in our study, the topic of reproductive management was ranked the highest among producers who were not planning to expand, and it was a top priority for producers who were planning to expand (Cabrera & Janowski, 2011). Results of the current survey align with the survey of Wisconsin dairy producers, suggesting that the topic of reproduction is of extreme interest to dairy producers in various parts of the United States.

In addition, we attempted to evaluate which reproductive management practices were the most common among producers by including the following question: "Which of the following practices apply to your reproductive program? (Check all that apply)." The most common reproductive management practice reported by producers was the use of visual estrus detection, with 80.0% of producers using this practice (Table 4). Furthermore, 35.7% of producers used tail paint or chalk as an estrus-detection aid, whereas only 11.4% had incorporated the use of accelerometers or pedometers as estrus-detection aids (Table 4). All producers having herds with more than 1,000 lactating cows used tail paint or chalk. In contrast, only 26.2% of producers having herds with less than 1,000 lactating cows used this method as an estrus-detection aid. Similar findings

were reported in the National Animal Health Monitoring Service (NAHMS) (2007) survey, which indicated that 93% of U.S. dairy operations used visual estrus detection as part of their reproductive management programs. The NAHMS (2007) survey indicated that a smaller percentage of producers perform visual estrus detection in the western U.S. states than in the eastern U.S. states (73% vs. 95%, respectively). Approximately 58% and 8% of U.S. dairy producers indicated that they used tail chalk and pedometers, respectively, to aid in estrus detection (Caraviello et al., 2006).

In our survey, 51.4% of respondents indicated that they employed timed artificial insemination programs (Table 4). The NAHMS (2007) survey showed that timed artificial insemination protocols were being used on 58.2% of U.S. dairy farms; however, the same survey indicated that fewer dairy farms in western U.S. states used timed artificial insemination protocols than in eastern U.S. states (35.6% vs. 60.3%, respectively). Incorporating timed artificial insemination in reproductive programs may decrease days to first insemination, reduce days open, and, consequently, increase reproductive efficiency (Ribeiro, Galvão, Thatcher, & Santos, 2012). Therefore, upcoming Extension programs in Kansas should focus on educating producers about the benefits of using synchronization programs that incorporate timed artificial insemination. In addition, Extension programs should focus on how to apply these strategies to improve reproductive efficiency. Furthermore, educating producers about the importance of using estrus-detection aids is essential because only 36% of producers indicated that they use estrus-detection aids. Producers can increase reproductive efficiency of cows and, consequently, profitability by combining the use of timed artificial insemination programs with estrus detection (Galvão, Federico, De Vries, & Schuenemann, 2013). It also is important to note that although 80% of the producers responding to our survey reported using visual estrus detection, this practice may not be the most effective way to detect cows in estrus considering that cows housed in facilities with concrete surfaces generally have decreased mounting activity compared with cows housed on dirt lots (Vailes & Britt, 1990). Using estrus-detection aids may assist in detecting greater percentages of cows in estrus.

**Table 4.**

Proportions of Responding Kansas Dairy Producers  
Using Specific Reproductive Management Practices

<b>Management practice</b>	<b>Response % (no.)</b>
Visual heat detection	80.0 (56)
Timed artificial insemination protocols	51.4 (36)
Natural service by herd bulls	44.3 (31)
Sexed semen in dairy heifers	38.6 (27)
Estrus-detection aids (chalk or paint)	35.7 (25)
Beef semen in dairy cows	12.9 (9)
Estrus-detection aids (accelerometers or pedometers)	11.4 (8)
Semen company artificial insemination technicians	8.6 (6)
Sexed semen in dairy cows	7.1 (5)

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**Beef semen in dairy heifers****4.3 (3)**

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The responding producers indicated that most of the inseminations are performed by on-farm employees. Only 8.6% of respondents indicated use of professional artificial insemination technicians (Table 4). Among the producers who used technicians from artificial insemination companies, 75% were located in the western part of the state and managed more than 2,000 cows. With regard to the use of sexed-sorted semen, 39% and 7% of producers reported using it to inseminate heifers and cows, respectively (Table 4). Khanal, Gillespie, and MacDonald (2010) found that approximately 10.4% of U.S. dairy producers were using embryo transfer and/or sexed semen in their herds in 2005. Use of sexed semen in reproductive programs has become popular since it was introduced in 2003 for commercial application (DeJarnette, Nebel, & Marshall, 2009; Stevenson, 2014). Use of sexed semen in combination with genomic testing to aid in breeding decisions has provided opportunities for additional revenue for dairy producers. In 2014, a genetics company reported a record high for beef semen sales to dairy producers (Cooperative Resources International, 2014). In our survey, 12.9% of producers indicated that they used beef semen for inseminations of cows, and 4.3% used beef semen for inseminations of heifers (Table 4).

Use of natural service was a common practice among respondents in our survey. Forty-four percent of producers reported using bull breeding in their reproductive programs (Table 4). Use of natural service was observed in all regions of the state. The northeast, central, and southeast regions accounted for 45.1%, 29.0%, and 12.9% of such responses, respectively. The results from the NAHMS (2007) survey also indicated that producers relied on natural service in their reproductive programs; with natural service being used for first service on 21.7% and 33.2% of operations for cows and heifers, respectively. Moreover, natural breeding for second and subsequent services was used on 22.2% and 35.1% of operations in the U.S. for cows and heifers, respectively (NAHMS, 2007). In addition to decreasing input costs of maintaining a bull on the farm, use of artificial insemination helps eliminate the hazard of housing bulls and venereal diseases they can spread to the cow herd. Despite the unnecessary risks associated with maintaining bulls, some producers may choose to house bulls on the farm in an attempt to generate pregnancies from less fertile subpopulations of cows in the herd (e.g., repeat-breeder cows).

## Limitations

The majority of respondents to the survey were located in the central and northeast regions of Kansas. As previously mentioned, the dairy industry in Kansas is geographically diverse; thus, the findings of the survey should be interpreted with caution to avoid potential biases.

## Conclusions

The Kansas Dairy Producers' Needs Survey demonstrated that dairy farms in Kansas are diverse in herd size and reproductive management practices, partly related to the geographic locations of the farms. As the dairy industry in Kansas continues to grow, more opportunities will be available for Extension programs and research projects to be conducted. The survey also showed that reproductive management is important to Kansas dairy producers and is an area in which they wish to improve. Ultimately, Extension professionals should tailor future Extension activities to improve producers' understanding of successful reproductive management practices, thereby resulting in increased efficiency on Kansas dairy farms. In addition, findings of the survey provide important insights to allied industries that support and service Kansas dairy businesses.

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