Journal of Dairy Science Volume 100 Special Issue: Summary

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The *Journal of Dairy Science* has been a driving force for dairy research and application over the last century. All aspects of dairy science are represented in the journal, from the production and harvesting of milk to its processing into a safe and affordable human food. In discussing the purpose and composition of this 100-year issue, attention was paid to the breadth of disciplines and fields encompassed by “dairy science.” It was a challenging task to determine an appropriate level of detail for the anniversary issue. “Dairy nutrition,” for example, was too broad, but a single chapter on “Vitamins” and another on “Minerals” was too narrow. An initial list of 40 subject areas was refined to the 30 subject areas that are included here. There is overlap between articles but that is true in science as well. Nutrition affects reproduction and milk composition; genetics affects milk production and nutrient requirements, and so on. Authors were selected based on their in-depth knowledge of current as well as historical aspects of a field. The entire field of dairy science owes a great debt to the authors who selflessly donated their time in the preparation of papers that are published herein. Individuals whose careers were defined by detail in their research efforts were forced to be summative and discriminatory in their presentation of 100 years of scientific literature.

Identifying 10 to 20 major findings or advances to be included in the timelines was not always easy or, in some cases, possible for the individual topic areas. Despite the challenges, an outstanding series of articles that identified and summarized key findings in dairy science was prepared. Students and researchers of the present need a solid foundation of what we know now so that we do not repeat the past instead of creating the future. We hope that the articles themselves and the associated timelines become valuable resources for this purpose. We also hope that funding bodies and

elected decision-makers take note of the papers because they demonstrate a strong example of what 100 years of direct public–private partnerships within the agricultural research sector can accomplish.

The *Journal of Dairy Science* has seen steady growth over its first 100 years (Figure 1). In total, almost 30,000 articles and 200,000 pages have been published. Major findings published in the journal in its first century of publication, as summarized in the 30 timelines in this issue, clearly demonstrate the wide and deep influence that dairy science research and application have had on the production of a safe and affordable food supply for humanity. Any attempt to estimate the economic impact of 100 years of dairy science would be futile. It is a simple fact that dairy science research, teaching, and application has made the world a healthier place by supplying milk for human consumption.

Many of the topic areas in dairy science today were well known to dairy scientists in 1917. For example, age at first calving was a topic addressed in the second issue of the journal and continues to be researched today. In 1917, the conclusion was that heifers should be fully grown to maximize production. Advances in nutrition and genetics over the past 100 years have made the conclusions from 1917 a reality in 2017. Topics such as genetic subtypes of casein, flavored cultured yogurt, artisan cheeses, antibiotic resistance, genetic selection for reproduction, balancing rations for amino acids, feeding for reduced environmental impact, animal welfare, and cow comfort were identified as relatively new fields by the authors. High-throughput measurement techniques, big data, modeling, genomics, systems biology, advanced statistics, rumen monitoring, and activity monitoring were not known at the 50-year mark and are now standard in our field. As in all scientific fields, dairy science demonstrates the continuous loop between the initial question, the testing of the hypothesis (research), the defense and publication of the results, and the creation of new questions based on the original research. This constant cycle of scientific discovery fueled by the inborn curiosity of the human condition has led to a century of dairy science research and vast improvements in the production and processing of milk.

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Figure 1. Number of pages per volume published in the *Journal of Dairy Science* in its first 100 years.

We will not attempt to predict the next 100 years in detail. It is completely reasonable to expect that we will see more and better integration of what we now still consider “separate” disciplines of dairy science. Research quality will continue to improve as demanded by our rising expectations of scientific endeavors and by our clients—farmers, consumers, and funding agencies. Fewer “university” and more “on-farm” studies will be conducted for practical reasons of cost and animal availability. At the same time, more and better laboratory (in vitro) studies will be conducted as we continue to probe in more detail at the cellular and molecular levels. Complex data sets will be the norm. Studies will be published that expand our understanding of the complex system that includes the cow, the farm,

the industry, and society. Research will regularly be published that relates the specific genetics, nutrition, and housing of the cow to meet a specific consumer demand for the product, the production system, and the environment.

Will the *Journal of Dairy Science* publish an additional 100 volumes? It is hard to say. What we can say is that 100 volumes of the *Journal of Dairy Science* demonstrate something unique and special about dairy scientists and their desire to create and share new knowledge. The *Journal of Dairy Science* was conceived and launched during the First World War. Indeed, dairy science has been done and manuscripts published through the most significant world-changing events of the 20th and now 21st centuries. It is not the requirement of “publish or perish” that explains the legacy of 100 years of dairy science and the peer-reviewed scientific literature that tells its story. Rather, the human spirit is defined in part by our desire to pursue new knowledge through scientific investigation and to use this information to help others. New discoveries motivate scientists to share their results with their generation and with many future generations.

Science faces many threats today, as do the journals that have served our scientific enterprise so well. Science and the scientific literature will change and the *Journal of Dairy Science* will change as well. Nonetheless, there will be dairy scientists actively working in the future to ensure the safe, efficient, and affordable production and processing of milk for human consumption. What we know from the first 100 years is that dairy scientists will tell others what they have learned through the pages of our journal and they will continue the significant scientific legacy of the *Journal of Dairy Science*.