TEN YEARS OF DCRC: WHERE WE'VE BEEN AND CHALLENGES FOR THE NEXT 10 YEARS

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TAKE HOME MESSAGES

- The DCRC has become a viable organization and continues to contribute to the viability of the dairy industry.
- The membership of DCRC is growing and is having impact on members beyond North America.
- The DCRC's future remains bright but its sustainability depends on a growing membership and continual industry support.
- Effective leadership of DCRC will require new participation of committed members.

INTRODUCTION

During the first decade of this century, a belief that fertility of lactating dairy cows was decreasing was prevalent among researchers, veterinary practitioners, and dairy producers. Most also accepted that reproductive performance (pregnancy per AI) in dairy cattle was critical to the survival of individual dairy operations and to the dairy industry as a whole. Reasons for this decrease in fertility were neither completely understood nor elucidated. Despite this negative trend, knowledge of reproductive physiology had been raised to unprecedented levels and significant advances in dairy reproductive management had been achieved by 2005. Such advances presented the dairy industry with an opportunity to counteract this reduction in reproductive efficiency. Nevertheless, adoption of reproductive technologies on commercial dairy farms was hindered by various factors. One missing key factor was a mechanism for communicating more effectively the novel ideas and technologies directly to dairy veterinarians and producers was missing. This missing link was in part because of fewer dairy extension specialists at land-grant institutions and reduction in numbers of academic faculty in the dairy sciences.

HISTORY OF THE DCRC

A formal invitation was sent during early autumn of 2005 to a select group of individuals who worked in various roles supporting the dairy industry (Table 1). The objective of the invitation was to convene a group representing different sectors of the dairy industry including academia, dairy veterinarians, dairy producers, and commercial companies to create a national forum and organization devoted to improving fertility in dairy cattle. That inaugural forum occurred October 17-18, 2005 in the Sheraton Westport Hotel in St. Louis, MO. To the best of our knowledge, the individuals who spearheaded this founding forum were Drs. Austin Belschner, Fred Moreira, William Thatcher, Jim Lauderdale, Jose Santos, Gary Heinrich, and Ellen Jordan. Travel and associated costs were supported generously by Pfizer Animal Health.

Preliminary Vision

The vision for this potential organization was to increase adoption of reproductive technologies by dairy producers to counteract the observed decrease in dairy cattle fertility. The objective of this organization was to promote direct communication between those who develop technology and products (researchers, consultants, and commercial companies) and those who would benefit from such technology (dairy practitioners and producers). The initial plan was to emulate a successful model organization such as the National Mastitis Council (NMC). We ultimately believed this organization could become the main source of information, reproductive technology, and

management recommendations for the dairy industry.

Table 1. Participants and their affiliation invited to the organizational forum in 2005 that launched the Dairy Cattle Reproductive Council

Invited participants	Affiliation
Academia	
Jose Santos	UC-Davis
William Thatcher	University of Florida
Ellen Jordan	Texas A&M University
Jeff Stevenson	Kansas State University
Matt Lucy	University of Missouri
Mike Overton	UC-Davis
Milo Wiltbank	University of Wisconsin
Paul Fricke	University of Wisconsin
Richard Pursley	Michigan State University
Allied industry	
Fred Moreira	Pfizer Animal Health
Austin Belschner	Pfizer Animal Health
Chris Roeder	Pfizer Animal Health
Gary Heinrich	Pfizer Animal Health
Barry Putnam	Genex
Dave Brister	Intervet Schering Plough
Jim Lauderdale	Lauderdale Enterprises
Myron Brown	Merial
Joe Dedrickson	Merial
Neil Michaels	ABS Global
Dave Prentice	ABS Global
Phil Modesitt	Church & Dwight
Ray Nebel	Select Sires
Ricardo Mattos	Monsanto Co.
Richard Markham	Phoenix Scientific
Daniel Luchini	NutriScience
Practicing veterinarians	
John Lee	California
Lee Jones	Veterinarian
Dairy producers	
Donald Niles	Casco, WI
Jack DeJong	Visalia, CA
Mike Schouten	Hereford, TX

Initial Meeting Agenda

The agenda for the organizational forum is in Table 2.

Results of the Organizational First Meeting

According to the newly formed By-Laws in 2005, the new organization became known as the Dairy Cattle Reproduction Council (DCRC). Later, in September of 2014, the Officers and Board proposed to amend the By-Laws to include new verbiage about responsibilities of election officers, board members, and committees, in addition to election procedures. These amended By-Laws were approved by a vote of DCRC members at the annual meeting held in Salt Lake City in November 2014. The DCRC was granted legal status in August 2014, as a public charity under Section 501 (c) (3) of the Internal Revenue Code of 1986. A $5,000 gift to the DCRC by the American Association of Dairy Science (ADSA) provided the necessary funding for the pursuit of this legal status. In making this possible, we thank then current ADSA board member, Geoffrey Dahl, for his successful advocacy to the ADSA Board in behalf of the DCRC.

Table 2. Meeting agenda for the organizational forum to create the DCRC

Time	Activity
08:00 – 08:15 am	Group introductions
08:15 – 08:45 am	"Current Status of Dairy Reproductive Performance" (William Thatcher)
08:45 – 09:30 am	"A Preliminary Vision for an Applied Dairy Reproductive Group" (José Santos)
09:30 – 10:45 am	Small group discussions to develop vision and objectives of an organization
10:45 – 11:15 am	Group presentations
11:15 – 12:00 pm	Group discussion: define vision and objectives
12:00 – 1:00 pm	Lunch
01:00 – 1:20 pm	"NMC history and critical success factors" (Gary Heinrich – Past president NMC)
01:20 – 01:40 pm	"Where do we go from here?" (José Santos, William Thatcher, Ellen Jordan)
01:40 – 04:00 pm	Group discussion to define the organizational structure Election of a leadership group Objectives for year-one Exploring funding opportunities Communication strategies
04:00 – 05:00 pm	Summary and action list (Jim Lauderdale and Gary Heinrich)

According to Article II, Section 1 of our By-Laws, the DCRC is organized exclusively for charitable, educational, and scientific purposes within the definition of Section 501 (c) (3) of the Internal Revenue Code of 1986, as amended, including but not limited to: (1) providing an education and professional organization whereby persons working in the general area of dairy cattle reproduction can effectively cooperate to serve the dairy cattle industry more successfully by the exchange of ideas, concepts, information, developments, and current problems; (2) by facilitating the dissemination of scientific and technical information through meetings and publications; (3) by the study, discussion and promulgation of current research work in the field; by the study and evaluation of new product applications from the industry and from professional society studies; and (4) by conducting cooperative studies, research and evaluations in and with the related arts and sciences of chemistry, engineering, veterinary medicine, and allied groups.

The DCRC may accept gifts and grants for financing the promotion of its educational, scientific and research activities or sponsoring programs for challenging and developing youth for leadership and professional responsibilities, but no part of the net earnings, if any, of said corporation shall ever inure to the benefit of any private shareholder, member, or individual.

Reflections

Our first Officers and Directors initially were "appointed or volunteered." See Table 3 for the summary of past and present officers and directors. We owe a debt of gratitude to these early officers and Board members. They passionately led our fledging organization and were the "founding fathers" of a now-viable organization. In the beginning, Charleston-Orwig (C|O) was a full partner in our organizational management. They (Mike Opperman, Casey Hushon, and Marcy Tessmann) were especially helpful and passionate about making our organization successful. Not only did they put their time and effort into the early growth of the DCRC, but C|O wrote off a significant amount of billable time to our organization. We barely survived financially in those early years despite the enthusiasm of our members and officers, and the backing of C|O. Another media partner was Bovine Veterinarian. They helped with the initial DCRC newsletters and sent it to their membership at a discounted rate to introduce DCRC to their members.

Because C|O is a public relations-marketing firm and did not normally serve other organizational functions necessary to manage the entirety of DCRC mission functions, we contacted Jamie Ritter at the Federation of Animal Science Societies (FASS) in 2013 about becoming involved as a partner with C|O to help manage our organization. Jamie Ritter worked with a local Illinois attorney, where FASS is located, to obtain IRS approval for the DCRC to have a 501(c) (3) status. Later, FASS took over the management of our website, annual meeting, voting, registration and membership functions, and financial management, while C|O continued to coordinate our quarterly newsletters and social media. With this dual arrangement, the DCRC has been well managed.

A great debt of gratitude is due Dr. Andrew Skidmore. He not only served as Secretary during the first 8 years of the DCRC but he nearly single-handedly managed our Reproduction Awards program. This unique awards program recognizes herds with superior 21-day pregnancy rates. Winners are recognized from herds in the U.S. and internationally as well. Andy was assisted by Jim Ferguson, who analyzes the raw data submitted by finalists to determine the winners. The model used in this analysis and results from the first 5 years were published (Ferguson and Skidmore, 2013). Early on Hoard's Dairyman published stories about the winners that were recognized at the annual meeting. In 2012, Hoard's Dairyman became a sponsor of the Reproduction Awards and do much of the administrative work required for the awards program to continue. In addition, others have sponsored the awards including Select Sires and Bayer.

Another debt of gratitude is due our sponsors. An alphabetical list of these donors and sponsors are in Table 4, without regard to their donated

amounts. The DCRC could have never come about without the support of many individuals who represented their companies and organizations as our advocates. A few individuals also financially supported meals at our annual meetings.

Table 3. Past officers, Board, and key committee members of the DCRC.

Meeting location	President	Vice-President	Secretary	Treasurer	Directors	Program Co-Chairs	Awards
2006 - Denver	J.E.P. Santos	R. L. Nebel	A. L. Skidmore	A. Belschner	…	W. W. Thatcher J.E.P. Santos E. R. Jordan	A. L. Skidmore
2007 – Denver	J.E.P. Santos	R. L. Nebel	A. L. Skidmore	A. Belschner	T. Klaustermeier E. R. Jordan K. McSweeney	W. W. Thatcher E. R. Jordan J. S. Stevenson	A. L. Skidmore
2008 – Omaha	R. L Nebel	M. C. Lucy	A. L. Skidmore	A. Belschner	E. R. Jordan K. McSweeney T. Klaustermeier	W. W. Thatcher J. S. Stevenson P. M. Fricke	A. L. Skidmore
2009 – St. Paul	M. C. Lucy	R. C. Chebel	A. L. Skidmore	A. Belschner	K. McSweeney T. Klaustermeier J. C. Dalton	J. S. Stevenson P. M. Fricke N. A. Michael	A. L. Skidmore
2010 – St. Paul/Boise	R. C. Chebel	G. Boomer	A. L. Skidmore	A. Belschner	T. Klaustermeier J. C. Dalton E. P. Aalseth	J.S. Stevenson P.M. Fricke N. A. Michael	A. L. Skidmore
2011 – Kansas City	G. Boomer	T. L. Bailey	A. L. Skidmore	A. Belschner	J. C. Dalton E. P. Aalseth T. R. Bilby	P.M. Fricke N. A. Michael M. W. Overton	A. L. Skidmore
2012 – Sacramento	T. L. Bailey	J. S. Stevenson	A. L. Skidmore	A. Belschner	E. P. Aalseth T. R. Bilby R. Gibson	N. A. Michael M. W. Overton J. C. Dalton	A. L. Skidmore
2013 – Indianapolis	J. S. Stevenson	N. Michael	A. L. Skidmore	A. Belschner	T. R. Bilby R. Gibson R. L. Harding	M. W. Overton J. C. Dalton R. A. Cerri	A. L. Skidmore
2014 – Salt Lake City	N. Michael	J. C Dalton	A. L. Skidmore	A. Belschner	R. Gibson R. L. Harding R. C. Chebel	J. C. Dalton R. A. Cerri G. M. Schuenemann	A. L. Skidmore
2015 – Buffalo[1]	J. C. Dalton	S. LeBlanc	J. Lee		R. L. Harding R. C. Chebel B. J. Jones	R. A. Cerri G. M. Schuenemann M. Utt	T. R. Bilby
2016 - Columbus	S. LeBlanc	T. R. Bilby	J. Lee		R. C. Chebel B. J. Jones P. E. Fricke	G. M. Schuenemann M. Utt L. G. D. Mendonça	T. R Bilby

[1]Under the revised 2013 By-Laws, the office of Secretary was combined with that of Treasurer.

Table 4. Alphabetical listing of individuals and companies who have financially supported the DCRC since its inception

ABS Global	DFA	Micro
Accelerated Genetics	DHI-Provo	Monsanto
Afimilk	DSM Nutritional Products	MultiMin
AgriLabs	E.I. Medical imaging	Parnell
Animart	Elanco	Partners in Reproduction
Arm & Hammer Animal Nutrition	Estrotect	Pine Creek Nutrition Services
Arun P. Phatak	GEA	REPRO RESULTS
Balchem	Hoard's Dairyman	SCR Dairy
BCF Technology	IDEXX	Select Sires
Bayer	IntelliBond	Semex
BioTracking, LLC	Intervet/Schering-Plough	Valley Ag Software
Bovine Veterinarian	IVS Animal Health	Virtus Nutrition
Charleston|Orwig	Merck Animal Health	Zinpro
DeLaval	Merial	Zoetis (Pfizer Animal Health)

Past presidents of DCRC (Table 3) were important in carrying forward the organization through regularly held Board teleconferences and providing leadership.

We also must thank Select Sires and Pfizer (now Zoetis) who chose to hold some of their employee meetings before our annual meeting, which increased our attendance and membership at several of the early annual meetings.

ANNUAL MEETINGS

Annual meetings (Table 3) originally were the beginning focus of DCRC. Attendance has always exceeded 200 attendees and sometimes approached 300. Annual meetings provided opportunity for networking of attendees and gathering of those passionate about increasing reproductive performance of dairy cattle. The first 2 annual meetings were held in Denver. Attendance at the first annual meeting in 2006 included 284 attendees: 15.1% were veterinarians; 16.2% dairy producers; 17.6% AI companies; 5.3% nutritionists; 25% pharmaceutical companies; 10.2% university, and 10.6% other. In 2007, an attendance of 300 attendees included: 25.3% veterinarians; 17.3% dairy producers; 20% AI companies; 4.7% nutritionists; 17% pharmaceutical companies; 10% university, and 5.7% other. In 2008 (Omaha), of 252 attendees: 32.5% were veterinarians; 11.1% dairy producers; 26.6% AI companies; 4.4% nutritionists; 13.9% pharmaceutical companies; 6.3% university, and 5.2% other. Based on the mix of attendees during the first 3 years, we believe the DCRC already succeeded in bringing together many of the major players in the management of reproduction of dairy cows in an effort to provide solutions.

Annual meetings have been moved around regionally to attract new members and veterinary practitioners and dairy producers who attended close to home. Many have attended multiple years despite the travel to other parts of the U.S. In 2010, we held 2 regional meetings in St. Paul and Boise. Both were successful meetings but the total attendance did not exceed what we achieved at one location so we disbanded that idea because of its increased cost. We also added posters to the meeting starting in 2010. The program committee recruited poster presentations from those given at annual AABP and ADSA meetings. Authors were requested to attend, and time was allotted during breaks for authors to "man" their posters.

The first annual meeting was heavily oriented to reproductive programs and health. From there all meetings have included some keynote speakers addressing more general global dairy industry

issues. Early on, the format of the meeting also was changed to include multiple concomitant break-out sessions in which attendees could choose 2 of 3 topics of interest. Most meetings have included 2 to 4 breakout sessions in the day and half meeting format. Using this approach, more topics were presented and nearly all attendees found a number of topics to their needs and interest.

Speaker Topics at Annual Meetings

Summarized in Table 5 are the topics and number of presentations made on each topic since our first annual meeting in 2006. The top 4 common themes that represented 35% of all presentations focused on reproductive management tools, genetic selection, genomics and their application, transition cow health and management, and AI programs.

The most frequent presentations dealt with general reproductive management (11%), which excluded the focus on specific AI programs per se. but dealt with their components to maximize fertility. AI techniques, role of the herd veterinary practitioner, management of cows in Israel, Mexico, and grazing herds, on-farm monitoring of reproductive procedures, AI versus natural service, and veterinary-contracted reproductive programs for dairy operations. Overall, the breadth of topics presented is quite impressive and reinforces the complex nature of physiology that can influence reproductive success in a dairy operation.

SERVICES PROVIDED BY DCRC

Dairy Reproduction Protocols

Synchronization protocols evolve rapidly as newer procedures are tested and improvements are made. To help veterinarians and industry professionals deal with rapid change and make informed decisions related to synchronization protocols, the DCRC created synchronization protocol sheets (in English and Spanish) for dairy cows and dairy heifers. The documents outline established synchronization protocols that may help dairy producers improve on-farm reproductive performance.

The DCRC first published our recommended dairy reproductive protocols for lactating cows in 2011, followed shortly thereafter were recommendations for dairy heifers. Many thanks to Dr. Matt Lucy for first spearheading this venture with the help of many others and developing the format of the information. Our philosophy has been to provide updates of these basic recommendations as new technologies become available based on well documented research and then revise and update them. These technologies include improvements to traditional approaches to reproductive management (heat detection and AI) as well as to approaches that synchronize AI so that all cows and/or heifers are inseminated at one time (timed-A.I. programs). Combinations of traditional and timed AI programs also are used on many farms. Regardless of the approach, a focused effort on reproductive management has been shown to increase pregnancy rates, translating to greater reproductive efficiency comparable with what was the norm 30 years ago on the dairy.

These documents are available on our website ((http://www.dcrcouncil.org/protocols.aspx) and are intended for educational purposes as consultants work with their dairy clients to make reproductive management decisions. The DCRC neither endorses one protocol over another, nor does the DCRC endorse synchronization protocols over any of the other approaches to dairy cattle reproduction. The protocol sheets are reviewed annually by representatives from the DCRC. New protocols will be included when they are validated in controlled studies.

Table 5. Invited speaker topics and frequency of presentations on those topics during the first 11 annual (2006 through 2016) DCRC meetings

Topic	No. of presentations	% or total
Reproductive management	18	11.0
Genetic selection, genomics, and applications	14	8.5
Transition cow health and management	13	7.9
Ovulation synchronization and resynchronization	13	7.9
Global issues concerning the dairy industry	12	7.3
Economics	12	7.3
Cow comfort and general health	12	7.3
Pregnancy diagnosis including ultrasound	10	6.1
Heifer AI management and synchronization	8	4.9
Pregnancy loss and embryo survival	7	4.3
Data and record management, metrics	6	3.7
Activity monitors	6	3.7
Uterine health	6	3.7
Behavior and welfare issues	5	3.0
Heifers development and growth	4	2.4
Nutrition	3	1.8
Sire fertility	3	1.8
Labor (communication)	2	1.2
Sexed semen	2	1.2
Heat stress	2	1.2
Herd health programs and vaccinations	2	1.2
Obstetrics and calving management	2	1.2
Estrus behavior and detection	2	1.2

Newsletters

Since 2007, newsletters are produced highlighting recent research. They most recently included such items as a president's message, meeting reminder, DCRC wearables, research summaries, featured columns, featured DCRC members, and an industry calendar. The newsletters are sent by email to members and are all available on the website.

Webinars

For the past several years, the top-rated talks at the annual meetings, determined by attendee evaluations, have become webinars presented during the following year and are available for industry to sponsor to help defray webinar costs. The webinars have been well received by the registrants and they further our opportunity to meet our education mission.

DCRC Membership

The DCRC offers multiple education resources to its members to enhance on-farm reproductive performance. A DCRC membership is available for professional members ($125) and for current students ($25).

All DCRC members receive:

- •Networking opportunities with top dairy industry professionals directly involved with dairy cattle reproduction.
- •Unlimited access to educational resources from past conferences.

- •Unlimited access to previous volumes of the DCRC E-Newsletter.
- •Six e-newsletters sent throughout the year, each full of new research, articles and topics related to improving dairy cattle reproduction.

International E-Membership

The DCRC recently created an e-membership opportunity for our partners outside of North America. This category is intended to encourage the broadest global participation of members in DCRC by offering a reduced price to international members who may not be able to attend the annual meeting each year. The annual fee for international e-membership currently is $65. Should circumstances change and an international e-member attends the annual meeting, they would pay to upgrade to regular membership ($60) with the meeting registration.

E-members will receive:

- •Access to Ask the Expert.
- •Unlimited access to education resources from past conferences.
- •Unlimited access to previous volumes of the DCRC E-Newsletter.
- •Access to new and previous webinars.

Free Trial Membership for Students

A 3-month free trial membership is available to all undergraduate and graduate students. An advisor email is needed to verify student status. Students participating in the free trial membership will receive full access to the benefits available to all regular DCRC Student Members. Student members may not register for the DCRC Annual Meeting as a student member unless they become a regular Student Member in order to receive registration discounts. A notification of the free trial ending is sent out before it expires. At that time each student has the option to enroll as a full Student Member, which requires annual dues in the amount of $25.

Free E-Member Trial Membership

A 6-month free trial membership is available for any person outside of North America. Those participating in the free-trial will receive full access to the benefits available to regular DCRC E-Members, which differs from a full DCRC membership. With the e-membership, registration to attend the DCRC Annual Meeting under this trial membership or under the regular E-Membership as a DCRC Member, individuals must become a Regular Member in order to receive registration discounts. A notification of the free trial ending is sent out before it expires. At that time each individual has the option to enroll in an E-Membership, which requires annual dues in the amount of $65.

FUTURE OF THE DCRC

The current advancements in improving reproductive performance of dairy cattle reflect the needs and challenges to integrate the disciplines of physiology, management, nutrition, genetics, economics, herd health, production medicine, and allied industries to sustain the reproductive competence of lactating dairy cows. Indeed, this is the skeletal and muscular nature of the DCRC in networking this diversity of disciplines to improve national and international dairy operations. Continual and revolutionary advancements during the next 10 years are and will be based on the novel and visionary applications of basic and applied sciences to optimize the reproductive efficiency of lactating dairy cows. Some forecasting for the future was addressed in a DCRC 2013 annual meeting presentation ("The Future of Reproductive Management," Thatcher et al., 2013).

Continued progress in the areas of cell biology, nutraceuticals to optimize both reproductive function and lactation, novel and biocompatible delivery systems of biological regulatory factors, genomic selection within the biological networks of the bull and cow, application of computer technology (e.g., activity monitors, body temperature, rumination or feeding times, etc.) to monitor biological processes of the cow and forecast treatment-management needs, viable offspring produced from an optimal endometrial environment that feeds an encapsulated early embryo to subsequently escape the perils of embryo mortality are but a

few examples of progress. Indeed the "Foster Mother of the Human Race: the "**COW**" is a biological model and food producer for mankind. What a unique example of a symbiotic life cycle.

Such a future is founded on the continued generation of competent, motivated and visionary people to harness knowledge and application to the dairy industry. The DCRC is a robust organization that will continue to soar in meeting the needs of the dairy industry. Commitment of new members and their visionary leadership is essential to the continued well-being of the DCRC mission.

REFERENCES

Ferguson, J. D., and A. Skidmore. 2013. Reproductive performance in a select sample of dairy herds. J Dairy Sci. 96:1269–1289.

Thatcher, W. W., C. R. Staples, and J E. P. Santos. 2013. The future of reproductive management. Proc. DCRC Ann. Meet., Indianapolis, pp 104–114.