



COUNCIL ON DAIRY CATTLE BREEDING

ACTIVITY REPORT

OCT19/SEP2020

USCDCB.COM

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TABLE OF CONTENTS

ABOUT CDCB	2
WORD FROM THE CHAIR	3
CEO COLUMN	4
CDCB BOARD OF DIRECTORS	5
CDCB WORKING GROUPS	6
CDCB PERSONNEL	7
CDCB DATA PROVIDERS	8
CDCB IN NUMBERS	9
YEAR IN REVIEW	10-11
FEED SAVED	12
GENETIC EVALUATIONS	13-15
OUTREACH	16-18
FINANCIAL REPORT	19

ABOUT CDCB

The Council on Dairy Cattle Breeding (CDCB) provides premier dairy genetic information services through industry collaboration centered around a mission to help optimize cow health and productivity in herds worldwide. This non-profit organization is responsible for calculating and distributing the genetic evaluations and genomic predictions, for managing the national cooperator database, and for analyzing and distributing dairy cattle data in the United States. The CDCB drives continuous improvement and maintains the integrity of the world's largest animal database, building on a quality foundation with more than eight decades of recorded U.S. dairy animal performance. The CDCB is a collaboration between four sectors of the U.S. dairy industry: Dairy Records Providers (DRP), Dairy Records Processing Centers (DRPC), National Association of Animal Breeders (NAAB) and Purebred Dairy Cattle Association (PDCA).

This report was prepared for the 2020 CDCB Industry Meeting held virtually on November 2, 2020.

CDCB MISSION

**TO DRIVE GLOBAL DAIRY CATTLE IMPROVEMENT
BY USING A COLLABORATIVE DATABASE TO DELIVER
STATE-OF-THE-ART GENETIC MERIT AND PERFORMANCE
ASSESSMENTS FOR THE HERD DECISION MAKING.**

WORD FROM THE CHAIR *Neal Smith*



It goes without saying, 2020 has been a very unusual year for all of us. We began the year as we normally do, with high expectations for growth and increased profitability for U.S. dairy producers and members of the Council on Dairy Cattle Breeding.

Our optimism faded quickly as COVID-19 began to dominate the news on

every network. By early April most of us were under “shelter in place” orders. A worldwide pandemic! I have many gray hairs, but that’s something I have not experienced before. Neither had anyone else, including the CDCB staff and Board of Directors.

I want to take this opportunity to congratulate the CDCB staff on their response to this crisis. With the office located in Bowie, Maryland, all staff have worked from home for seven months now with no significant interruptions in service.

During that time, they delivered two full genetic evaluations, including a base update and several other significant changes, plus monthly and weekly runs. We are very proud of the CDCB staff.

Since February, all board meetings have been virtual online events, via video service providers. This is necessary to protect our health, but it is also saving CDCB money. It’s a small silver lining in the COVID-19 experience.

Strong Financial Position

The four member sectors of CDCB work together to provide high quality genomic and genetic evaluations for dairy producers in the United States and around the world. Over the past several years we have worked hard to build a solid financial foundation to enable the Council to be nimble enough to capitalize when research and development opportunities exist. With over 8 million dollars in total assets...

...the Council is positioned to stay on the cutting edge of technology and retain the highly skilled staff needed to get the job done.

New and Improved Traits

CDCB will launch the new trait, Feed Saved, with the December genetic evaluations. Feed efficiency research has been a high priority for dairy producers for decades and we are pleased to lead this work. A few pennies saved per cow per day will have a huge economic impact for producers. Heifer Livability and six new genomic type traits will also be launched in December.

Improvements to calving ease evaluations were also implemented in August. This was a recommendation from the Producer Advisory Committee (PAC), chaired by Lloyd Holterman. CDCB staff worked closely with the PAC and industry committees to define changes and align the genetic base with the actual levels of dystocia experienced on U.S. farms.

Summary

The Council on Dairy Cattle Breeding is a growing business. We are in the business of dairy genetics, and we provide complimentary services to member sectors. As new traits are added, female genomic testing continues to grow. The staff has put together a great program for the November 2nd virtual meeting. We invite you to join us via Zoom to learn more about what’s new for December and beyond.

On behalf of the CDCB Board of Directors and staff, I want to thank all dairy producers for your business and support. We also want to thank our industry partners in the U.S. and around the world. Without your help and cooperation, we could not be successful.

“FEED EFFICIENCY RESEARCH HAS BEEN A HIGH PRIORITY FOR DAIRY PRODUCERS

for decades and we are pleased to lead this work. A few pennies saved per cow per day will have a huge economic impact for producers.”

CEO COLUMN João Dürr



“The only constant in life is change” – Heraclitus

The hardest task when writing about 2020 is to avoid repeating what everyone has said, read or heard already. It is definitely a year we will remember, and the history books will reserve a chapter for this global pandemic.

Among all possible aspects of these interesting times, what strikes me the most is how we can radically change and adapt to completely unexpected conditions and yet manage to handle challenges and seize opportunities with the resources at hand. Nobody was prepared to face a worldwide pandemic and humankind is paying a high price in the process of finding a way out of it.

Nevertheless, similarly to many other sectors of our society...

...the dairy industry quickly adapted to the new conditions and provided the response that families needed to continue serving nutritious dairy products in their tables.

The CDCB team promptly responded to Maryland's government appeal, and all staff members have been working full time from home since March 16, 2020. Most importantly, none of the service activities and development projects have been delayed because of the new working conditions. We are truly grateful to continue serving this great industry with no interruptions, always counting on the support of the team at USDA AGIL*.

In the last 12 months, CDCB not only delivered all genetic evaluations as scheduled but also implemented a series of improvements. The CDCB team and our partners updated the genetic base, launched Jersey health traits, improved methods and data edits for calving ease traits, enhanced the inbreeding estimation procedures and the predictive SNP set, extensively updated the genomic data pipeline, and upgraded CDCB's data processing capacity

by separating the production and the development environments.

Besides these achievements, steady progress has been made in other important projects that will add even more value for the CDCB service users. The multi-institutional project to expand the existing feed efficiency database, jointly funded by FFAR and CDCB, has added a valuable number of new records despite challenges brought by COVID-19, allowing CDCB to launch Feed Saved genomic evaluations in December 2020, along with Heifer Livability.

Broadening the product portfolio must be accompanied by improvements on the way services are delivered to the users. That is why CDCB has been working with DataGene on a complete redevelopment of our web services, from the animal queries to the summary statistics, which will be displayed next year via a brand new website built by our communications partner, Look East.

Following the recommendations from the February 2019 industry meeting in Reno, Nev., CDCB staff is building a network of partners to develop data pipelines that will support evaluations of lameness and hoof health-related traits, which have a high economic impact in all dairy operations.

In the current scenario, looking at the future may feel like facing the complete unknown, given the uncertainties around public health and the pandemic impacts on mobility and the economy. The way we successfully navigated 2020 reinforces our determination to keep pushing forward projects to enhance the national cooperator database and the evaluation system, always based on state-of-the-art research. This can be accomplished only through the great leadership of the CDCB Board of Directors and the commitment of the U.S. dairy producers for continuous improvement and support of the CDCB mission.

“CDCB IS BUILDING A NETWORK OF PARTNERS to develop data pipelines that will support evaluations of lameness and hoof health-related traits.”

*United States Department of Agriculture, Agricultural Research Service

CDCB BOARD OF DIRECTORS

The CDCB Board of Directors directs the development and continuous improvement of U.S. dairy genetics and CDCB services.

Three new Board members were welcomed in 2020:

- **Robert Fourdraine, Ph.D.**
- **Paul Hunt**
- **Susan Lee**

These new Directors fill terms vacated by Dave Hallberg of Hall-Lar Registered Holsteins, Chuck Sattler of Select Sires, Inc., and Bill Verboort of AgriTech Analytics. Thank you to these individuals for dedicating their time and expertise.

OFFICER TEAM

Four individuals serve above-and-beyond, as the current finance committee and CDCB officer team for 2019-2021:

- **Neal Smith, Chair**
- **Dan Sheldon, Secretary**
- **Jay Weiker, Vice Chair**
- **John Clay, Ph.D., Treasurer**

The Board has continued with its planned meeting cadence, transitioning to virtual sessions to provide seamless direction to CDCB work plan and priorities.

“Cooperation from across the dairy sectors is the core of CDCB, and that is reflected in the composition of the Board of Directors that paints the vision and guides our progress,” states João Dürr, CEO of CDCB. “It is only possible to achieve our mission because of the dedication and commitment of this Board of Directors – and the leaders that laid the foundation before them.”

2020-2021 BOARD OF DIRECTORS

Dairy Records Providers

- **Susan Lee, Idaho DHIA, Jerome, Idaho**
- **Jay Mattison, National DHIA, Verona, Wis.**
- **Dan Sheldon, Secretary, Woody Hill Farms, Salem, NY**

Dairy Records Processing Centers

- **John Clay, Ph.D., Treasurer, Dairy Records Management Systems, Raleigh, NC**
- **Lee Day, Amelcor, Provo, Utah**
- **Robert Fourdraine, Ph.D., VAS, Madison, Wis.**

National Association of Animal Breeders

- **Paul Hunt, URUS Group, Madison, Wis.**
- **Katie Olson, Ph.D., ABS Global, DeForest, Wis.**
- **Jay Weiker, Vice Chair, NAAB, Madison, Wis.**

Purebred Dairy Cattle Association

- **Corey Geiger, Ran Rose Holsteins, Mukwonago, Wis.**
- **Neal Smith, Chair, American Jersey Cattle Association, Reynoldsburg, Ohio**
- **Lindsey Worden, Holstein Association USA, Inc., Brattleboro, Vt.**

Non-Members Supporting the CDCB Board

- **Jack Gravelle, CDCB Attorney, Porter Wright Morris & Aurther LLP**
- **João Dürr, Ph.D., CDCB Chief Executive Officer**
- **Ezequiel Nicolazzi, Ph.D., CDCB Chief Operation Officer**
- **Duane Norman, Ph.D., CDCB Technical Advisor & Industry Liaison**
- **Paul VanRaden, Ph.D., USDA AGIL Industry Liaison**

USDA AGIL = United States Department of Agriculture, Animal Genomics and Improvement Laboratory



Directors and staff participating in the October 20, 2020, Board meeting included: **Top row (L-R):** Lindsey Worden, João Dürr, Neal Smith, José Carrillo, Katie Olson. **Second row (L-R):** Paul VanRaden, Paul Hunt, John Clay, Robert Fourdraine, Cindy Ferrier. **Third row (L-R):** Javier Burchard, Susan Lee, Lee Day, Dan Sheldon, Ezequiel Nicolazzi. **Bottom row (L-R):** Corey Geiger, Jack Gravelle, Jay Mattison, Jay Weiker

Thank you
**Gordon A.
DOAK**

U. S . REPRESENTATIVE TO THE INTERBULL STEERING COMMITTEE

Gordon Doak serves as the U.S. representative on the Interbull Steering Committee. Gordon has been instrumental in CDCB since its formation and retired in 2018 after 42 years with National Association of Animal Breeders. *Thank you, Gordon, for your continued commitment to dairy cattle improvement.*

CDCB WORKING GROUPS

CDCB appreciates the industry and academic leaders that serve on CDCB working groups to provide valuable input in a spirit of ongoing collaboration and continuous improvement of CDCB products.

PRODUCER ADVISORY COMMITTEE (PAC)

PURPOSE

Provide grassroots input for development of strategy, policy and activity, including future priorities and opportunities to be pursued by the CDCB.

GROUP MEMBERS

Lloyd Holterman, *Chair, Rosy-Lane Holsteins, Watertown, Wis.*
Kent Butters, *Butter Dell Dairy, Lewiston, Utah*
Patrick Crave, *Crave Brothers Dairy, Waterloo, Wis.*
Brent Czech, *New Heights Dairy LLC, Rice, Minn.*
Matt Hendel, *Hendel Farms, Caledonia, Minn.*

DAIRY EVALUATION REVIEW TEAM (DERT)

PURPOSE

Provide independent, objective and confidential reviews of the CDCB triannual dairy genetic evaluation results prior to the public (official) release in April, August and December. This has enabled identification of issues and improved evaluation-day data release.

GROUP MEMBERS

Mehdi Sargolzaei, *Select Sires Inc.*
Sam Comstock, *Holstein Association USA*
Tom Lawlor, *Holstein Association USA*
Ryan Starkenberg, *ABS Global, Inc.*
Bob Welper, *PEAK Genetics*
Cari Wolfe, *American Jersey Cattle Association*

GENETIC EVALUATION METHODS (GEM)

PURPOSE

Provide independent, objective and impartial advice and strategic guidance to AGIL and CDCB staff throughout the development of dairy genetic evaluations.

GROUP MEMBERS

Chuck Sattler, *Select Sires Inc., Chair*
Chad Dechow, *Penn State University*
Tom Lawlor, *Holstein Association USA*
Christian Maltecca, *North Carolina State University*
Paul VanRaden, *USDA AGIL*
Cari Wolfe, *American Jersey Cattle Association*
Ezequiel Nicolazzi, *CDCB*

EVALUATION FREQUENCY TASK FORCE

PURPOSE

Prepare a cost-benefit analysis of increasing the frequency of full genetic evaluations and an implementation strategy (if current frequency is modified).

TASK FORCE MEMBERS

Chuck Sattler (Chair) and Andy Stiefel, *representing National Association of Animal Breeders*
Lee Day and John Clay, *representing Dairy Records Processing Centers*
Steven Sievert, *representing Dairy Records Providers*
Cari Wolfe and Tom Lawlor, *representing Purebred Dairy Cattle Association*
Paul VanRaden, *USDA AGIL*
João Dürr, *CDCB*
Ezequiel Nicolazzi, *CDCB*

THE PURSUING DATA QUALITY TEAM, which has served many years to provide strategic counsel, is being restructured. CDCB expresses gratitude to the dedicated members: **Sam Comstock**, *Holstein Association USA*; **Burke Day**, *Amelcor*; **Jenny DeMunck**, *PEAK Genetics*; **Jana Hutchison**, *USDA AGIL*; **Erick Metzger**, *American Jersey Cattle Association*; **Steven Sievert**, *Quality Certification Services Inc.* and **Duane Norman and Kristen Parker Gaddis**, *CDCB*.

CDCB PERSONNEL

Successful implementation requires that the right resources be deployed. In 2020, CDCB expanded its team to satisfy the growing demand for services and products that benefit dairy producers.

Much progress has been made since CDCB assumed complete responsibility of the national cooperator database and U.S. genetic evaluations five years ago. Yet, opportunities continue to grow – to leverage genomic technologies, develop new data pipelines and continue improving dairy production. The expanded CDCB team is set to maximize these emerging opportunities.

I am incredibly proud of how the CDCB team and our partners rose to the challenges of 2020 and continued to deliver service seamlessly and on schedule to our end users. We remember that dairy farmers are central to all that we do at CDCB. I am humbled to work with this innovative, solution-oriented, and dedicated team, along with the excellent researchers at USDA AGIL.

Thank you for your commitment.

– João Dürr

Lillian Bacheller, *Senior Applications Developer*
 Javier Burchard, Ph.D., *Chief Innovation Officer*
 José Carrillo, Ph.D., *Chief Data Officer*
 João Dürr, Ph.D., *CEO*
 Cindy Ferrier, *Office Manager*
 Kristen Parker Gaddis, Ph.D., *Geneticist*
 Gerald Jansen, *Technical Advisor*
 Jay Megonigal, *IT Manager*
 Rodrigo Mota, Ph.D., *Applied Geneticist*
 Ezequiel Nicolazzi, Ph.D., *Chief Operation Officer*
 Kendra Randall, *Project Manager*
 Frank Ross, *System Administrator*
 Duane Norman, Ph.D., *Technical Advisor & Industry Liaison*
 Marius Temzem, *Database Administrator*
 Lauren Thomas, *Data Specialist*
 Kaori Tokuhisa, *MSC, Genomic Data Analyst*
 George Wiggans, Ph.D., *Technical Advisor*
 Xiao-Lin (Nick) Wu, Ph.D., *Product Development Manager*

We thank

FIONA GUINAN and TAYLOR MCWHORTER, 2019 CDCB interns, for their continued work with CDCB in special projects.



Thank you to the CDCB staff for dedicated service.

TOP ROW (L-R): Duane Norman, João Dürr, Rodrigo Mota, Lillian Bacheller, George Wiggans **SECOND ROW (L-R):** Jay Megonigal, Kristen Parker Gaddis, Lauren Thomas, Taylor McWhorter, Ezequiel Nicolazzi **THIRD ROW (L-R):** Kaori Tokuhisa, Fiona Guinan, Cindy Ferrier, José Carrillo, Kendra Randall **BOTTOM ROW (L-R):** Javier Burchard, Marius Temzem, Gerald Jansen, Frank Ross, Nick Wu.

CDCB DATA PROVIDERS

DAIRY RECORDS PROVIDERS

Aguiar Milk Testing, Inc.	DHIA West	Lancaster DHIA	Southern DHIA Affiliates
AgSource Cooperative Services	Gallenberger Dairy Records	Mid-South Dairy Records	Tennessee DHIA
Arizona DHIA	Heart of America DHIA	Minnesota DHIA	Texas DHIA
Central Counties DHIA	Idaho DHIA	Northstar Cooperative DHI Services	Tulare DHIA
Dairy Lab Services	Indiana State Dairy Association	Puerto Rico DHIA	United Federation of DHIA's
Dairy One Cooperative Inc.	Integrated Milk Testing Services	Rocky Mountain DHIA	Washington State DHIA
DHIA Cooperative, Inc.	Jim Sousa Testing	San Joaquin DHIA	

GENOMIC NOMINATORS

ABS Global, Inc.	Genetic Visions-ST LLC	National Association of Animal Breeders, Inc.	Semex Alliance
American Jersey Cattle Association	Holstein Association USA, Inc.	Neogen Corporation dba Geneseek	VHL Genetics
Bio-Genesys Ltd.	Holstein Canada	PEAK Genetics	Weatherbys Scientific
Czech Moravian Breeders' Corporation, INC (CMBC)	Labogena DNA	Select Sires Inc.	Zoetis

PUREBRED DAIRY CATTLE ASSOCIATION

American Guernsey Association	Holstein Association USA, Inc.
American Jersey Cattle Association	Red and White Dairy Cattle Association
American Milking Shorthorn Society	U.S. Ayrshire Breeders' Association
Brown Swiss Cattle Breeders' Association	

DAIRY RECORDS PROCESSING CENTERS

AgriTech Analytics
AgSource Cooperative Services
Amelcor
Dairy Records Management Systems

GENOMIC LABORATORIES

Bio-Genesys Ltd.	VHL Genetics
Genetic Visions-ST LLC	Weatherbys Scientific
Labogena DNA	Zoetis
Neogen Corporation dba Geneseek	

INTERNATIONAL COOPERATORS

Agriculture and Horticulture Development Board (GBR)	National Livestock Breeding Center (NLBC) (JPN)
ANAFI (ITA)	Interbull Centre (35 countries)
BSW Intergenomics (8 countries)	Qualitas (CHE)
Lactanet (CAN)	vit (DEU)

U.S., CANADIAN COLLABORATION IN HOOF HEALTH DATA

Dairy cow lameness is an important animal health, well-being and economic topic, with estimates that about one-half of dairy cows will be affected by lameness during their productive life. CDCB is establishing partnerships to develop a hoof health data pipeline from U.S. dairy herds, to advance genetic evaluations and expand management tools.

Planning began with a comprehensive workshop in September 2020 facilitated by CDCB with representatives from USDA AGIL, Lactanet (Canada), Hoof Trimmers Association, University of Minnesota, University of Calgary, Dairy Management, Inc. and Foundation for Food and Agriculture Research. Workshop topics included:

- Existing knowledge on dairy cattle hoof health in the U.S. and Canada
- Current trends in genetics and management tools to enhance hoof health
- Current hoof care organizations and related action plans

- Development of a pipeline to capture phenotypic information related to hoof health, necessary to enhance the reliability of evaluations and generate additional health management tools for dairy herds

Outcomes of the workshop included the confirmation of intent by all parties to develop a hoof health pipeline, identification of key stakeholders and their involvement, and determination of core leadership to advance the action plan. Watch for updates as this important collaboration and development continues.

Photo Credit: DeLaval



CDCB IN NUMBERS



2009

Year genomic evaluations available in U.S.

Young genomic sires account for

74%

all A.I. breedings in U.S. (2020)



>4½ million genotypes in world's largest animal database.

GENOTYPES



12% Jersey

86% Holstein

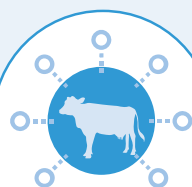
♂ 10% of genotyped animals are male

♀ 90% of genotyped animals are female

905,185 animals genotyped in the last 12 months (10.1.19 to 9.30.20)

6 annual DHI summaries produced

4.1M cows in 12,324 herds enrolled in DHI test plans (2020)



50 traits calculated by CDCB

- 4 selection indexes
- 5 production traits
- 19 health, fertility & calving traits
- 22 conformation traits
- 23 official genetic conditions & haplotypes

Weekly genomic predictions for new genotyped animals

Monthly genomic evaluations

Triannual evaluations conventional, genomic & Interbull (in APR, AUG & DEC)

13M

Lactation, Calving, Breeding and Health records added for each triannual evaluation

5.5M

DHI records in CDCB health evaluations Holstein

690K

DHI records records in CDCB health evaluations Jersey

Dairy Cows by Breed

AMONG 4.17M COWS WITH RECORDED BREED IN DHI HERDS (2019)

Ayrshire 2,112

Brown Swiss 9,416

Guernsey 3,219

Holstein 3,347,166

Jersey 326,791

Milking Shorthorn 842

Multi-Breeds 480,774

YEAR IN REVIEW OCT 19 / SEP 20

OCTOBER 2019

- “Genetics of Feed Efficiency” was the theme of the **5th annual CDCB industry meeting** during World Dairy Expo in Madison, Wis. *Details on page 16.*
- **John Clay**, CDCB Treasurer, was one of five recipients of National Dairy Shrine’s **Pioneer Award**.

JANUARY 2020

- João Dürr, Gordon Doak and Jay Mattison represented U.S. dairy at **Interbull strategic planning meeting**.

FEBRUARY 2020

- **Gerald Jansen** joined CDCB as consultant for software development and analytics.

MARCH 2020

- The **4 millionth genotype** was uploaded to the CDCB **National Cooperator Database** on March 2.
- New **annual summaries based on DHI* information** were posted: DHI Participation, State and National Standardized Lactation Averages by Breed and Somatic Cell Counts.
- March 9 marked 50 years of employed service by **Duane Norman**, CDCB’s Technical Advisor and Industry Liaison.
- **Kendra Randall** was promoted to Project Manager, and Cindy Ferrier joined CDCB as Office Manager.
- **Lauren Thomas** and **Xiao-Lin “Nick” Wu** started new roles as Data Specialist and Product Development Manager, respectively.
- CDCB pivoted to **work-from-home** and forged full-speed ahead to ensure service continuity and on-time delivery of evaluations.



PRODUCER ADVISORY COMMITTEE (L-R):
Kent Buttars, Lewiston, Utah; Chair Lloyd Holterman, Watertown, Wis.; Patrick Crave, Waterloo, Wis. and Matt Hendel, Caledonia, Minn. NOT PICTURED: Brent Czech, Rice, Minn.

DECEMBER 2019

- CDCB Board approved two new services – **SNP-based parentage verification and certification** and **quick turnaround genomic predictions** – and expansion of the CDCB team to satisfy growing service demand.
- The CDCB Board approved enhancements to **calving ease evaluations** after comprehensive review by invited scientist Dr. Stefano Biffani.
- **Producer Advisory Committee (PAC)** held its first **in-person meeting** with Board and staff, to empower grassroots input and maximize relevance for dairy herds.

The four millionth genotype

was recorded in the CDCB database on March 2, 2020 – an incredible feat possible through collaboration between the U.S. and Canada and among dairy producers, genotyping labs, nominating organizations, international partners, CDCB and USDA AGIL.**.

The first U.S. Holstein sires were genotyped in 2008. After seven years, the one million milestone was hit in August 2015. Since then, the database has grown more rapidly as genomic testing has been readily adopted in dairy herd replacement and genetic program strategies.

The National Cooperator Database of dairy phenotypic and genomic data managed by CDCB remains the world’s largest animal database, at 4,531,631 genotypes on September 30, 2020.

First Sires
Genotyped





MAY 2020

- **SNP-based parentage certificate service** began.
- Industry collaboration for prompt analysis and re-alignment of **genotypic and phenotypic bases for calving traits**.
- **CDCB and Lactanet Canada** confirmed their cooperation in data sharing, joint services and research.
- CDCB Board member and founding father, **Jay Mattison**, was named National Dairy Shrine's **2020 Guest of Honor**.

JUNE 2020

- Papers presented at **2020 ADSA Virtual Meeting** included three from CDCB staff, five from AGIL scientists and two from former CDCB interns.
- CDCB sponsored the Lush Award in Animal Breeding, presented to **Christian Maltecca** at the ADSA meeting
- **Paul VanRaden** of USDAAGIL** was inducted into JDS Club 100 joining CDCB Technical Consultants and former USDA colleagues, George Wiggans and Duane Norman.
- CDCB updated the **DHI* reports**, Reasons that Cows in DHI Programs Exit the Herd and Reproductive Status of Cows in DHI Programs.

SEPTEMBER 2020

- **Paul M. VanRaden** inducted into the USDAARS*** Science Hall of Fame.
- **Rodrigo Reis Mota** welcomed as CDCB Applied Geneticist.
- CDCB facilitated **hoof health workshop** to establish partnerships and plan for data pipelines.
- **John Cole** of USDAAGIL received the Research Award, presented by National Association of Animal Breeders.

APRIL 2020

- The routine **5-year genetic base update** was implemented. *Detail on page 14.*
- **Health evaluations for Jerseys become available**, after multi-stakeholder work to increase health event data into the CDCB database. *Detail on page 14.*
- The **80K prediction SNP set** used in genomic evaluations was updated to incorporate newly-discovered, more informative SNPs. *Detail on page 14.*
- CDCB Board transitioned to **Zoom meetings and welcomed three new Directors**.
- The Board approved a **policy for haplotype tests** and established schedules for **launch of Feed Saved and Heifer Livability**.
- CDCB Board approved participation in a Genome Canada project to **enhance the reference population for feed efficiency**.

JULY 2020

- CDCB and USDAAGIL** presented the upcoming **reset to calving traits**. *Detail on page 15.*

AUGUST 2020

- CDCB announced its virtual format for the **6th annual Industry Meeting**, November 2.
- **Triannual evaluations** reflected a recalibration of calving traits, update to Net Merit\$ related to calving traits and new inbreeding calculation procedure. *Detail on page 15.*



* Dairy Herd Information

** United States Department of Agriculture, Animal Genomics and Improvement Laboratory

*** United States Department of Agriculture, Agricultural Research Service

FEED SAVED TO ENHANCE DAIRY EFFICIENCY, SUSTAINABILITY

Starting in December 2020, producers have a new tool – genetic evaluations for Feed Saved – to breed for more feed-efficient cows and save on feed costs, the largest expense item on most U.S. dairies.

“There is tremendous potential to improve feed efficiency through genomic selection,” said João Dürr, CDCB CEO. “It’s a ‘win-win’ for dairy producers and for our customers who expect more sustainable milk and animal proteins. Genetic selection for Feed Saved can improve farmer profitability and substantially reduce the greenhouse gas footprint of the dairy industry. We can make the same amount of milk with less feed and fewer natural resources to produce and process that crop.”

Feed Saved evaluations for Holsteins will be released as a single trait on December 1, 2020. Feed Saved is expected to be included in Net Merit in April 2021.

While genetic selection for feed efficiency has been a long-time goal, it is difficult to measure and evaluate individual animals. The goal is to identify specific cows that eat less than expected while maintaining production and body condition. To develop genetic evaluations, the necessary data – daily feed intake, milk yield, milk composition, body weight, and body condition score – must be measured for our reference population.

Such research has been a collaboration between USDA AGIL, CDCB and several universities. In May 2019, CDCB and the Foundation for Food and Agriculture Research

(FFAR) announced new funding to collect feed intake and sensor data on an additional 3,600 cows over five years and to better understand genetic relationships with methane emissions. This builds on earlier research funded by USDA NIFA,*** which established a feed efficiency database of genotypes and phenotypes for 5,000 U.S. Holstein cows from multiple locations.

Despite lower reliability than other traits, Feed Saved as a selection criterion can have a significant economic impact. Currently, genetic gain savings by selecting for Net Merit breeding value is approximately \$50 per cow per year. Incorporating Feed Saved into this overall selection objective will allow producers to make 1% further progress. While this seems a small number, expanded to the 9 million dairy cows in the U.S. equates to \$4.5 million in additional genetic progress for the U.S. dairy industry (VanRaden et al., 2018).

The introduction of CDCB’s Feed Saved evaluation is an exciting step towards more efficient and sustainable dairy production.

FEED SAVED TRAIT

- One number for genetic selection
- **Feed Saved:** expected pounds of feed saved per lactation
- Larger positive values indicate a more feed-efficient animal
- Combines body weight composite (BWC) and residual feed intake (RFI)
 - **Body weight composite:** stature, strength, body depth, dairy form, and rump width
 - **Residual feed intake:** difference between a cow’s expected and actual feed intake, after accounting for production, size, and change in body weight.
- Database of >6,300 Holstein cows with feed efficiency records
- Heritability about 14%
- Low average reliabilities, due to the limited phenotypes currently available

FEED SAVED COLLABORATION

FEED SAVED DEVELOPMENT

Kristen Parker Gaddis, CDCB Geneticist
Paul VanRaden, USDA AGIL* Senior Research Geneticist
Javier Burchard, Ph.D., CDCB Chief Innovation Officer

PRODUCER AND INDUSTRY INPUT

CDCB Board of Directors
CDCB Producer Advisory Committee
CDCB Dairy Evaluation Review Team
CDCB Genetic Evaluation Methods committee
See group members on pages 5, 6
NAAB** Dairy Sire Evaluation committee

RESEARCH AND DATA COLLABORATION

Michigan State University: *Mike VandeHaar (lead investigator) and Rob Tempelman*

University of Wisconsin, Madison: *Kent Weigel and Heather White*

Iowa State University: *James Koltes*

University of Florida: *José Santos and Francisco Peñagaricano*

USDA AGIL: *Randy Baldwin, John Cole, Erin Connor and Paul VanRaden*



*United States Department of Agriculture, Animal Genomics and Improvement Laboratory **National Association of Animal Breeders

***United States Department of Agriculture, National Institute of Food and Agriculture

GENETIC EVALUATION CHANGES

Adoption of new tools, data and methodology support our goals for continuous improvement and top-quality evaluations.

DECEMBER 2019

- Updates in calculation of evaluations for crossbred animals
- Correction to use of foreign fertility evaluation
- End of line policy in effect for all CDCB files
- IP change in all servers

December 2019 change detailed on [CDCB website](#)

APRIL 2020

- Genetic base update
- Disease resistance traits for Jerseys
- New edits for disease resistance traits
- Changes to the editing criteria and modeling parameters for calving traits
- New SNP set for genomic evaluations
- New standard deviations for type traits in non-Holstein breeds
- Discontinuation of subset format 38 files

April 2020 change detailed on [CDCB website](#)

AUGUST 2020

- Recalibration of calving ease and stillbirth traits
- Net Merit \$ updates related to calving traits
- New inbreeding calculation procedure

August 2020 change detailed on [CDCB website](#)

COMING IN DECEMBER 2020

- Feed Saved trait introduction for Holsteins
- Heifer Livability trait introduction
- Genomic evaluations on 6 type traits
- Updates in the genetic correlations used in evaluations
- Inbreeding calculation procedure updates
- BBR stability update

December 2020 changes detailed on [CDCB website](#)

NEW IN DECEMBER: HEIFER LIVABILITY

A new trait, Heifer Livability, will be introduced in December 2020 for Holsteins and Jerseys.

Leveraging the National Cooperator Database, disposal codes were studied from 3.4 million heifer records of all breeds with birth dates between 2009 and 2016. Differences in breeds and sires confirmed the presence of a genetic component for heifer livability. The mean recorded death loss was 4%, based on deaths between two days of age and when the heifer left the herd, or until the maximum imposed of 18 months. (Stillbirths and deaths in the first two days were excluded as they are accounted for in stillbirth evaluations.)

Heifer Livability had a favorable genetic trend in recent years, likely because of selection for correlated traits. Correlations of Heifer Livability were 0.44 with productive life, 0.34 to 0.36 with yield traits, and 0.36 with early first calving on proven Holstein bulls.

Heifer Livability will be available in December as an individual trait. When Net Merit is updated in April 2021, Heifer Livability could be included with 1% of emphasis.

HEIFER LIVABILITY

	HOLSTEIN	JERSEY
Range of Genomic predicted transmitting abilities (GPTA)	-1.6% to +1.6%	-0.5% to +0.5%
Standard deviation of GPTAs	0.5%	0.2%
Reliabilities for young animals with genomic tests	46%	30%
Breeding Value trend*	+1.4	+0.7

*Between birth years 2010 and 2015, corresponding to recent base change

View [research presented at ADSA](#) by Mahesh Neupane and the [complete story](#) by Duane Norman, including future developments for increased data on heifer health and livability.



Photo Credit: Progressive Dairy

2021 TRIANNUAL EVALUATION DATES:

April 6, August 10 and December 7, 2021

Net Merit update planned for April 6, 2021



APRIL 2020 GENETIC BASE UPDATE

The every-five-year base change was implemented in April 2020, with the new base defined by milking cows born in 2015. This was the first base change to reflect all benefits from genomic selection achieved from 2010 to 2015. (With genomic selection initiated in 2008, a small portion of genomic benefits would have been revealed in the previous base change for cows born in 2010.)

Takeaways: Genetic progress of the past five years

- All lifetime merit indexes showed genetic improvement for all six main U.S. breeds. The largest gains were for Holsteins, Jerseys and Ayrshires.
- Genetic gains were made in all three yield traits (milk, fat, protein) for all breeds. Particularly, Holsteins and Jerseys made significantly more progress in the recent five years, than in the five years preceding.
- Guernseys, Holsteins, Jerseys and Milking Shorthorn showed increased genetic capacity for longer life.
- While Holsteins improved for all three fertility traits, overall breeds, 13 of the 18 fertility estimates showed unfavorable changes.
- Resistance against diseases in Holsteins improved for five of the six traits.
- Overall, favorable gains were achieved for 81 of the 102 traits (excluding conformation), while 18 were unfavorable.

Greenhouse gases are being reduced per unit of product because of greater production per animal, and cow appearance and health continues to improve.

Find [complete detail and tables](#) on the CDCB website.

HEALTH TRAITS FOR JERSEYS

Disease resistance (health) evaluations – which were launched for Holsteins in April 2018 – were made available for Jersey animals in April 2020. Evaluations are derived from Jersey data recorded in Dairy Herd Information (DHI) herds – thanks to a concerted industry effort led by American Jersey Cattle Association to transfer more Jersey health data to the National Cooperator Database.

Frequencies of the six disorders in U.S. Jerseys vary considerably as 10.4% of recent lactations included a code for clinical mastitis, while only 1.3 and 1.2% had a code for displaced abomasum and milk fever. The Predicted Transmitting Abilities (PTAs) are presented as percentage points above or below the breed's average resistance with more positive values being favorable. [View more details.](#)

CBCB Disease Resistance Traits
 Displaced abomasum (DA)
 Hypocalcemia, or milk fever (MFEV)
 Ketosis (KETO)
 Mastitis (MAST)
 Metritis (METR)
 Retained placenta (RETP)

EVALUATION MODEL UPDATE

Effective in April 2020, the disease resistance evaluations for both breeds were improved with new edits to phenotypic records and a model change to include a sire by herd interaction effect.

The U.S. dairy herd will be healthier as we incorporate disease resistance into breeding programs.

Today's food customers and consumers are paying attention and even requesting assurances of animal health.

NEW 80K SNP SET UTILIZED

In April 2020, CDCB implemented use of newly-discovered SNPs that better track inheritance in additional breeds and traits. Markers with largest effects were selected to replace previous, less-informative markers so that the total number of SNPs used in genomic calculations remain approximately 80 thousand.

The selected markers were also provided to genotyping laboratories in September 2019 to allow future improvement of their arrays.



“ADVOCATES FOR IMPROVING

sustainability and eliminating world hunger should be amazed at the increased productivity of U.S. dairy.

A RESET ON CALVING TRAITS

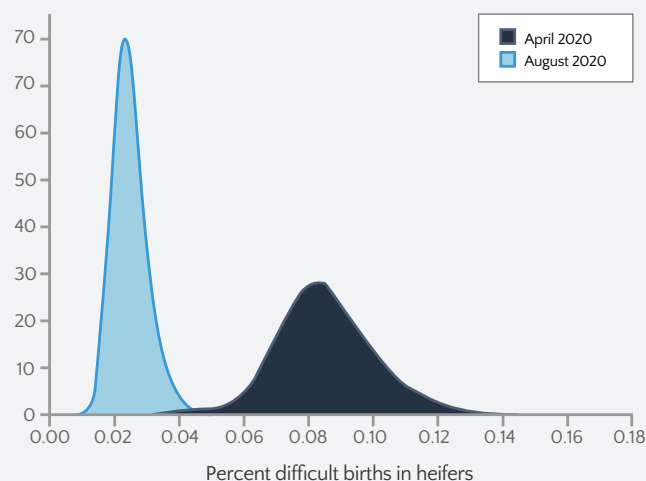
In August 2020, CDCB evaluations for Sire Calving Ease (SCE), Daughter Calving Ease (DCE), Sire Stillbirth (SSB) and Daughter Stillbirth (DSB) were adjusted to reflect the reduced incidence of dystocia in today's U.S. herds.

Calving traits – previously problematic for many U.S. dairy farms – have been successfully improved in recent decades through better genetics and management. The April 2020 results, following the genetic base change, sparked an industry dialogue about the best way to express the Predicted Transmitting Abilities (PTAs) for calving ease and stillbirth. A prompt, comprehensive analysis demonstrated a mismatch between the PTAs published in April 2020 and the actual rate of dystocia and stillbirth on most farms.

With consensus among industry partners, CDCB adjusted the phenotypic base for calving traits to match the observed, on-farm incidence rates, effective in August. As a result, there was a re-scaling of evaluations. In August, Holstein sire PTAs averaged 2.2% SCE and 2.7% DCE, while Brown Swiss averaged 3.0% SCE and 2.8% DCE.

Stillbirth evaluations were changed to reflect only births from first-calf heifers, instead of births from all ages as previous, for consistency with calving ease. Average PTAs for SSB and DSB also decreased in August, to a lesser extent than calving ease.

Distribution of Holstein sire calving ease PTAs based on the April 2020 and August 2020 bases



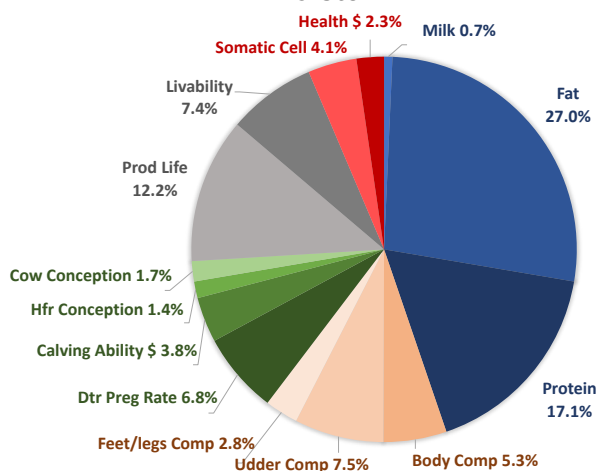
“
IN AUGUST,
HOLSTEIN SIRE
PTAS AVERAGED
2.2% SCE and 2.7% DCE,
while Brown Swiss
averaged 3.0% SCE and
2.8% DCE.
”

Coordinated industry communications were created to help producers and industry partners understand this re-calibration, including a [webinar](#) and [series of articles](#).

NET MERIT: CHANGES IN TRAIT WEIGHTINGS

The trait weightings in Net Merit and other indices were modified slightly in August 2020, in connection with the adjusted phenotypic base for calving traits. The four calving traits – Sire Calving Ease, Daughter Calving Ease, Sire Stillbirth and Daughter Stillbirth – are included in Net Merit \$ through a calving ability index (CA\$). With a lower standard deviation due to the new phenotypic base, the relative weight of CA\$ in Net Merit changed from 4.8% to 3.8%. Consequently, the relative weighing of several other traits were redistributed at slight levels.

WEIGHTING OF TRAITS IN NET MERIT \$ Holstein



CDCB August 2020

IMPROVED INBREEDING CALCULATION IMPLEMENTED

CDCB implemented an improved, highly efficient inbreeding calculation procedure with the August evaluations, which provides a more current reference population and better accounts for additional ancestors and changing pedigrees. The new procedures are now included in all unofficial weekly and official monthly evaluations. Using an updated reference population for inbreeding calculation at every evaluation run allows for a more precise correction of PTAs and provides more accurate results important for mating decisions.

MADISON MEETING EMPHASIZES FEED EFFICIENCY

CDCB hosted its 5th annual industry meeting at World Dairy Expo in Madison, Wis., on Tuesday, October 1, 2019, drawing dairy producers and representatives from artificial insemination (AI), genomic nominators, breed associations, dairy herd information (DHI) and dairy records processing centers (DRPCs).

Presentations and conversation centered on the intersection of feed intake, feed efficiency and social responsibility. Detail was shared on future U.S. genetic evaluations for feed efficiency – planned for December 2020 and possible through expanded data collection and research funded by CDCB and Foundation for Food and Agriculture Research (FFAR).

Keynote presentations were delivered by researchers at the five institutions participating in the FFAR-CDCB funded research.

- U.S. efforts to create a feed efficiency database, Mike Vandehaar, Michigan State
- How do we measure feed efficiency? Heather White, University of Wisconsin-Madison
- Precision dairy is here to stay, James Koltes, Iowa State
- Genetic dissection of dairy cow feed efficiency, Francisco Peñagaricano, University of Florida

CDCB, AGIL SCIENTISTS, INTERNS PRESENT AT ADSA

Papers presented at the American Dairy Science Association (ADSA) meeting June 22–24, 2020, included three from CDCB team members, five from AGIL scientists and two from former CDCB interns.

CDCB PRESENTATIONS

- Kristen Parker Gaddis, Implementation of national health trait evaluations in Jersey
- H. Duane Norman, Genetic and environmental changes in dairy traits revealed from a genetic base update
- George Wiggins, Parent and grandsire discovery in a rapidly expanding collection of genotypes

PRESENTATIONS FROM AGIL SCIENTISTS

- Juan Nani, Methods to implement ancestor discovery in the US dairy cattle database
- George Liu, Comprehensive analyses of 723 transcriptomes enhance genetic and biological interpretations for complex traits in cattle

- Preview of feed efficiency genetic evaluations, Paul VanRaden, USDA Animal Genomics and Improvement Laboratory

In opening remarks, CDCB Chair Neal Smith called for stronger collaboration and focus on producers. “Our focus moving forward – in addition to providing the best genetic possible evaluations – is stronger collaboration and communication with stakeholders. Dairy producers are at the top of that list.”



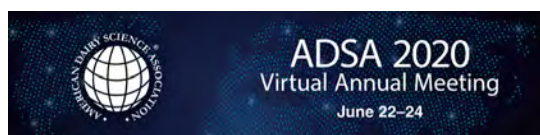
Researchers collaborating in feed efficiency work answered audience questions. From left to right, James Koltes, Paul VanRaden, Mike Vandehaar, Francisco Peñagaricano and Kent Weigel.

- A. Al-Khudhair, Imputation and investigation of sequence genotypes for 6,735,530 variants of 39,048 Holsteins
- Daniel Null, Quality control to improve properties of sequence genotypes from different sources
- M. Neupane, Genomic evaluation of heifer livability

CDCB INTERNS

- Taylor McWhorter (2019 CDCB intern), Investigating conception rate for beef service sires bred to dairy cows.
- Isaac Haagen (2017 CDCB intern and PhD student with Chad Dechow at Penn State), Genetic parameters of passive transfer in Holstein calves

Additionally, João Dürr, John Cole and Paul VanRaden were invited panelists. Dürr (of CDCB) and Cole (of AGIL) were two of six panelists in a roundtable discussion on genetic evaluations, which emphasized that genetic and genomic evaluations will continue to evolve so that producers can breed cows that fit the needs of their environment and the market. As the panel addressed audience questions, common themes arose in the discussion surrounding traits and technologies that are predicted to hold importance in the future. [Click here for the roundtable summary, “Genetic evaluations are all about the future.”](#)



STAKEHOLDER OUTREACH OCT 19 / SEP 2020

With “industry collaboration” at the heart of the CDCB mission, the CDCB team continues to engage with global audiences, demonstrating U.S. leadership.

INVITED PRESENTATIONS

JAVIER BURCHARD, Innovation Director, spoke at the International Symposium on One Health in Curitiba, Brazil. With 600 participants, it was the first of its kind in Brazil and focused on human, animal and environmental health. Burchard highlighted the important role of the National Cooperator Database and genetic tools to aid in disease prevention and judicious use of antimicrobials.

[October 9-10, 2019](#)

JOSÉ CARRILLO, Chief Data Officer, presented “Large scale genetic evaluation in dairy” at the Neogen-GeneSeek Industry Advisory Council meeting in Lincoln, Neb. With attendees from a range of animal sectors, Carrillo spoke on the dairy genomic revolution of the past decade and highlighted future opportunities.

[November 13, 2019](#)

JOSÉ CARRILLO spoke at the Alamo Genetic Center in his native country of Paraguay. While more focused on beef cattle, the Alamo team was intrigued with application of genomics and the strength of the U.S. system.

[October 11, 2019](#)

At the University of Hawaii at Mānoa, **JOSÉ CARRILLO** delivered an online lecture for Dr. Yanghua He’s animal breeding and genetics class. Carrillo described the impacts of genomics, new innovations and big data in global dairy breeding and management.

[March 23, 2020](#)

Veterinarians learned the latest in genetics through **GEORGE WIGGANS’** participation in the American Association of Bovine Practitioners webinar series. “What’s New at CDCB: Crossbreds, Base Change, New Traits” was Wiggans’ theme, with focus on traits in development

[April 14, 2020](#)

JOSÉ CARRILLO presented “Development and implementation of genomic tools in breeding programs” through Facebook to 200 viewers, hosted by Paraguayan Association of Brangus Breeders.

[April 14, 2020](#)

JOÃO DÜRR participated in a Select Sires – Brazil webinar, sharing news about CDCB and U.S. genetic evaluations with an audience of more than 200. Brazil is one of the largest international markets for American genetics, and CDCB evaluations are the main reference used in the country.

[August 19, 2020](#)

EZEQUIEL NICOLAZZI presented during the XLVIII Argentinean Congress of Genetics organized by SAC (Argentinean Society of Genetics). Nicolazzi presented an abstract co-authored by George Wiggans on dairy cattle genomics in the U.S.

[September 26, 2020](#)

EZEQUIEL NICOLAZZI joined a Facebook Live session hosted by the Brown Swiss association in Italy, describing U.S. genetic evaluations and role of CDCB and partners within the U.S. system.

[October 8, 2020](#)

CDCB PUBLICATIONS: POPULAR PRESS

[Why Do Cows Leave the Milking Herd Earlier than in the Past?](#) By Dr. H. Duane Norman, November 2019

[Health Evaluations for Jerseys Arriving on April 7, 2020](#)
By H. Duane Norman, Kristen Parker Gaddis and Laura Jensen, January 2020

[Changes in the Breed Composition of U.S. Dairy Herds](#)
By Fiona Guinan, January 2020

[April 2020: Genetic Base Change](#)
By H. Duane Norman, Paul VanRaden and George Wiggans, February 2020

[Thank You, Dairy Producers, for Outstanding Milk Quality](#) By H. Duane Norman, March 2020

[What’s Going on With Calving Ease?](#)
By Sophie Eaglen and John Cole, May 2020

[How Concerned Should We Be About Inbreeding?](#)
By Duane H Norman, May 2020

[August 2020 Calving Traits Will Reflect Lower Breed Averages](#)
By John Cole, Sophie Eaglen, Thomas Lawlor and Ezequiel Nicolazzi, June 2020

[Coming Soon: Genetic Evaluations for Heifer Livability!](#)
By Duane Norman, Mahesh Neupane, Paul VanRaden, October 2020

[Hay Burners Versus Hay Converters, special for Hoard’s Dairyman](#)
By Kristen Parker Gaddis, November 2020

[Genetic Tool for Feed Efficiency Coming in December, special for Progressive Dairy](#)
By Kristen Parker Gaddis, November 2020



¹ Dairy Herd Information Association

INDUSTRY AND GOVERNMENT COLLABORATION

Javier Burchard attended the “Foster our Future” event organized by The Foundation for Food and Agriculture Research (FFAR), centered on science-based contributions to solve global animal health challenges, advance data value and promote policies around innovation. FFAR awarded a \$1 million grant in mid-2019 – which CDCB matched – to fund research and measure feed intake and sensor data at four universities and USDA AGIL. This was a critical step to increase phenotypic data and enable launch of the Feed Saved trait in December 2020.

February 5, 2020

Dürr Advocates for Dairy Genomic Research Priorities

João Dürr advocated for dairy genomic research, presenting an industry perspective on the USDA Blueprint for Animal Genome Research during a workshop held in conjunction with the Plant and Animal Genome XXVIII Conference in San Diego. The audience included scientists and funders of agricultural research. Dürr demonstrated the need and opportunity for specific research to improve dairy genetics and advance key USDA priorities, such as optimizing animal production, reducing the effects of animal disease, applying precision technologies to animal phenotyping, and training the next generation of animal scientists.

January 2020

CDCB Engaged in NDHIA Annual Meeting

Ezequiel Nicolazzi, Javier Burchard and João Dürr

participated in the 2020 National DHIA Annual Meeting, Leadership Workshop & Educational Session in Savannah, Ga. Nicolazzi was a panelist in the roundtable “Animal ID: Usability, Edits, Corrections and Moving Forward,” as part of the Quality Certification Services (QCS) Field Service Advisory Committee meeting. Dürr participated in the National DHIA Leadership Workshop, presenting a CDCB activity update and serving on the panel, “ID Overview- Where We Are and a Direction to Go.” John Cole of USDA presented AGIL research activity and progress.

March 2-5, 2020

DCRC, CDCB Present Webinar on Calving, Feed Saved

CDCB collaborated with Dairy Cattle Reproduction Council (DCRC) to deliver the webinar, “Genetic Impacts on Calving and Feed Efficiency,” to DCRC members, non-member professionals and students, and dairy producers. Ezequiel Nicolazzi and Kristen Parker Gaddis summarized the recent re-scaling of calving traits and introduced Feed Saved to the diverse DCRC audience.

[Link to recording.](#)

October 2

CDCB AND AGIL RESEARCHERS ARE HONORED TO HAVE PARTICIPATED IN THESE PROJECTS RESULTING IN THESE PUBLICATIONS.

[Enhancements to U.S. genetic and genomic evaluations in 2018 and 2019](#), Interbull Annual Meeting Proceedings, Interbull Bulletin. 55:26–29 Nicolazzi, E., Bacheller, L.R., Fok, G.C., Parker Gaddis, K.L., Jensen, L., Megonigal, Jr, J.H., Norman, H.D., Null, D.J., Walton, L.M., Wiggans, G.R., Cole, J.B., Durr, J.W., Van Raden, P.M.

[Extending genomic evaluation to crossbred dairy cattle – US implementation](#), Interbull Annual Meeting Proceedings, Interbull Bulletin. 55:46–49 Wiggans, G.R., Van Raden, P.M., Nicolazzi, E., Tooker, M.E., Megonigal, Jr, J.H., Walton, L.M. 2019. Extending genomic evaluation to crossbred dairy cattle – US implementation.

[Discovering ancestors and connecting relatives in large genomic databases](#), *Journal of Dairy Science*, December 16, 2019 Nani, J.P., Bacheller, L.R., Cole, J.B., Van Raden, P.M.

[Genomic predictions for crossbred dairy cattle](#), *Journal of Dairy Science*, December 16, 2019 Van Raden, P.M., Tooker, M.E., Chud, T.C.S., Norman, H.D., Megonigal, Jr, J.H., Haagen, I.W., Wiggans, G.R.

[GWAS and fine-mapping of livability and six health traits in Holstein cattle](#), *BMC Genomics*, January 13, 2020 Freebern, E., Santos, D.J., Fang, L., Jiang, J., Parker-Gaddis, K., Liu, G., Van Raden, P.M., Maltecca, C., Cole, J.B., Ma, L.

[Genomic prediction of residual feed intake in US Holstein dairy cattle](#), *Journal of Dairy Science*, January 15, 2020 Li, B., Van Raden, P.M., Guduk, E., O’Connell, J.R., Null, D.J., Connor, E.E., VandeHaar, M.J., Tempelman, R.J., Weigel, K.A., Cole, J.B.

[A genetic investigation of island Jersey cattle, the foundation of the Jersey breed: Comparing population structure and selection to Guernsey, Holstein, and United States Jersey cattle](#), *Frontiers in Genetics*, April 17, 2020 Huson, H., Sonstegard, T., Godfrey, J., Hambrook, D., Wolfe, C., Wiggans, G., Blackburn, H., Van Tassell, C.

[Symposium review: Development, implementation, and future perspectives of health evaluations in the United States](#), *Journal of Dairy Science*, April 21, 2020 Parker Gaddis, K.L., Van Raden, P.M., Cole, J.B., Norman, H.D., Nicolazzi, E., Durr, J.W.

[The profiling of DNA methylation and its regulation on divergent tenderness in Angus beef cattle](#), *Frontiers in Genetics*, August 26, 2020 Zhao, C., Ji, G., Carrillo, J.A., Li, Y., Tian, F., Baldwin, R.L., Zan, L., Song, J.

[Investigating conception rate for beef service sires bred to dairy cows and heifers](#), *Journal of Dairy Science*, November 1, 2020 McWhorter, T.M., Hutchison, J.L., Norman, H.D., Cole, J.B., Fok, G.C., Lourenco, D.L., Van Raden, P.M.



FINANCIAL REPORT

Provided below is a summary of the Council on Dairy Cattle Breeding (CDCB) audited financial statements for fiscal year (FY) 2019 and 2018 (January–December). In 2018 the CDCB transitioned a portion of cash to an investment portfolio managed by Morgan Stanley, this relationship continued in 2019.

During 2019, CDCB entered into an agreement with DataGene Limited for computer programming/software. Also, during 2019, CDCB entered into research/grant agreements with Michigan State University and North Carolina State University.

Financial statements are prepared monthly and reviewed by the CDCB Board of Directors. In addition, Tidwell Group, LLC performed an audit for years ended December 31, 2019 and 2018. The audit report documents the financial statements are presented fairly, in all material respects, the financial position of Council on Dairy Cattle Breeding as of December 31, 2019 and 2018, and the changes in its net assets for the years then ended in accordance with accounting principles generally accepted in the United States of America.

2019 OPERATING REVENUE

2019 operating revenue increased 25% compared to 2018. CDCB implemented a fee structure change in June 2019.

EXPENSES INCREASED

Total expenses were similar to 2018, however, CDCB reported an increase in staffing and contract expense and reduced depreciation expense.

INVESTMENTS

Investments managed by Morgan Stanley reported market gains, as well as unrealized gain on investments.

2018 AND 2019 AUDITED FINANCIAL STATEMENTS

ASSETS	2019	2018
Cash	\$ 1,091,011	\$ 585,117
Investments, at fair value	\$5,400,773	\$4,955,441
Accounts Receivable	795,934	700,367
Property & Equipment (net book value)	73,274	59,881
Other	83,986	76,992
Total Assets	<u>\$ 7,444,978</u>	<u>\$ 6,377,798</u>
LIABILITIES & NET ASSETS		
Accounts payable	\$ 274,390	\$ 203,879
Long-Term Payable	75,000	100,000
Accrued Expenses	14,208	11,167
Total Liabilities	<u>363,598</u>	<u>315,046</u>
Unrestricted Net Assets	<u>7,081,380</u>	<u>6,062,752</u>
Total Liabilities & Net Assets	<u>\$ 7,444,978</u>	<u>\$ 6,377,798</u>
REVENUES		
Female Fees	\$ 1,891,918	\$ 1,195,638
Male Fees		
Initial Fees	1,295,571	869,490
AI Fees	1,202,525	1,525,050
Other	37,107	19,097
Investment Income	<u>89,074</u>	<u>10,109</u>
Total Revenues	<u>\$ 4,516,195</u>	<u>\$ 3,619,384</u>
COST OF OPERATIONS		
Salaries, Service and Administration	\$3,530,393	\$ 3,363,300
Research and Development	246,400	243,404
Depreciation	77,032	168,495
Interest Expense	-	-
Total Cost of Operations	<u>\$3,853,825</u>	<u>\$3,775,199</u>
Change in Net Assets from Operations	<u>\$ 662,370</u>	<u>\$ (155,815)</u>
Other Income (Expense) Net realized and unrealized loss on investments	356,258	(8,803)
Change in Net Assets from Operations	<u>\$1,018,628</u>	<u>\$ (164,618)</u>
Net Assets, beginning	\$6,062,752	\$ 6,227,370
Net Assets, ending	<u>\$7,081,380</u>	<u>\$6,062,752</u>



CDCB VISION

TO BE THE LEADING SOURCE OF GENETIC
INFORMATION FOR DAIRY IMPROVEMENT.

CDCB VALUES

DAIRY-DRIVEN
SCIENCE-BASED
COOPERATIVE
TRANSPARENT
DATA-DRIVEN



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