OCTOBER 2018

Newsletter

AMERICAN ASSOCIATION OF BOVINE PRACTITIONERS

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THE PRESIDENT'S MESSAGE

It's a Wrap!

Wow! What a conference! As I recover this Monday morning after seven wonderful days with my fellow bovine colleagues, a flight delay from a potential bomb threat and the absence of luggage, I'm struggling to condense my thoughts into the newsletter word limit.

Again (as I have throughout my career after AABP meetings), I came home inspired. Inspired by the enthusiasm, spirit and potential of the veterinary students in attendance. Inspired by the depth of long-term relationships with veterinary colleagues and the tremendous opportunity to reconnect. Inspired by the grit, determination and genuine concern for clients exhibited by veterinarians during challenging times. Inspired by the recognition of the work and service of those awarded during the conference. Inspired by the work of our program committee who, beginning before close of our 2017 meeting in Omaha, worked hard throughout the year, providing creative planning and execution of a truly outstanding event.

Following are some examples of fond memories and images of excellence from the 2018 AABP Annual Conference:

- Seeing the program come together like a well-oiled machine. The 2018 AABP Program Committee did a great job of identifying topics, using their network to procure the very best speakers and following through with overseeing all of the logistics of each session. Many thanks to these committee members for coordinating the following sessions:
  Dr. Mark Hilton – General
  Dr. Callie Willingham – Dairy
  Dr. Arn Anderson – Cow-Calf
  Dr. Tom Portillo – Feedlot
  Dr. Renee Dewell – Student
  Dr. Emmanuel Rollin and Dr. Eduoard Timsit – Research Summaries
  Dr. David Welch – Practice Management
  Dr. Mark Hardesty – Practice Tips
  Dr. Calvin Booker – Preconference Seminars
- The opening video from Dr. Sonny Perdue. Secretary Perdue is the first veterinarian to serve as Secretary of Agriculture and the first veterinarian to serve in a presidential cabinet position. The video did a great job of highlighting the "Become Indispensable" theme and mentioned how AABP member, Dr. Randall Spare and the Ashland Veterinary Clinic, became "control central" during the devastating fires that affected Kansas last year. This exemplified being indispensable to not only clients, but an entire community. For those of you who missed the video, it is available on the AABP website homepage at www.aabp.org.
- Dr. Morgan McArthur. The keynote address was lively, entertaining and focused on the "Become Indispensable" theme. This is the first time I've seen part of a presentation delivered while the speaker was doing pushups!
- The Amstutz Auction. This has become my favorite of all AABP events. This year, over $71,500 was raised, making this the second largest fundraiser in AABP history. Thanks to Dr. Callie Willingham for taking over the reins of the Amstutz Auction from Dr. Jim Floyd. At this auction you truly witnessed the full circle of what AABP membership is all about. Here you saw the future talent and potential of outstanding veterinary students and the spirit of giving back from AABP members. On more than one occasion, recipients of these awards have stated how much they appreciate AABP and how they look forward to the day when they can give back to the next generation.

- The next, next generation. I enjoyed seeing Dr. Arn Anderson with his grandson, Cason, and Dr. Charlie Hatcher with his grandson, Hatcher.
- Dr. Mike Apley's President's address. Mike culminated a productive year as AABP President with an excellent, heartfelt closing message. His "widow's mite" story about an experience during the 2017

Kansas wildfires was a moving description of true service and what it means to be indispensable in our communities.

- Our AABP staff. Allison Noble, Tabatha Condren and Tasha Holland from the office in Ashland made it look easy this year. They were well-prepared and worked hard to ensure seamless activity at the registration desk. We are very fortunate to have these individuals on the AABP staff. Steve Johnson, AABP Information Technology Coordinator, and his wife, Liz, did their usual outstanding job.

Many individuals and events, not mentioned here, contributed to the success of this year's meeting. I am sure each of you have unique memories of this year's conference. Hopefully these fond memories will stay with you throughout the year until we meet again.

See you in St. Louis!

Dr. Glenn Rogers

FUTURE MEETINGS

American Association of Bovine Practitioners

2019	**St. Louis**	**September 12 – 14**
2020	Louisville	September 24 – 26
2021	Minneapolis	September 23 – 25
2022	Long Beach	September 22 – 24
2023	Milwaukee	September 21 – 23
2024	Columbus	September 12 – 14

AABP Recent Veterinary Graduate Conference

2019	Columbus	February 7 – 9

World Association for Buiatrics

2020	Madrid, Spain	September 13 – 18

DISCLAIMER

The AABP does not take responsibility for information contained in or accuracy of the abstracts published in this newsletter.

ACTIVITIES AND ADVOCACY

The following are activities AABP leadership has been involved in for the benefit of members and the industry:

- 2018 AABP Annual Conference and AABP Board of Directors meeting, Phoenix, Ariz. – Executive Vice President

AABP NEWS

2018 51st AABP Annual Conference is a Success in the Valley of the Sun

At the 2018 51st Annual Conference of the American Association of Bovine Practitioners, held Sept. 13-15 in Phoenix, Ariz., veterinarians, students and other animal health professionals from across the country and the globe gained new knowledge and skills from the conference program geared toward the theme, "Become Indispensable".

"To 'Become Indispensable' means to become absolutely necessary to the cattle and cattle caretakers in our sphere of influence," says 2018 Program Chairman and Incoming AABP President Dr. Glenn Rogers, Aledo, Texas. "This involves clinical competence and a deep understanding of each client's operation and development of long-term trust relationships. A goal of AABP as an organization is to remain or become indispensable to all bovine veterinarians."

A healthy conference attendance included 1,204 individuals including 351 students, 135 American Association of Small Ruminant Practitioner (AASRP) members, six veterinary technicians, 130 accompanying persons, and 419 exhibitor representatives from 115 commercial and educational booths in the large trade show. Total attendance was 1,646 from 16 countries. The AASRP again met jointly with AABP at this conference.

Continuing education included 14 in-depth preconference seminars in addition to a special veterinary school faculty symposium, nine clinical forums, practice tips, research summaries, poster sessions and over 50 scientific sessions covering general topics, beef, dairy, practice management, small ruminants and more.

Proceedings from the 2018 AABP Annual Conference should be available online soon with an estimated print date shortly after the first of the year. Draft proceedings are available now for many sessions. Go to the Conference tab at www.aabp.org and click on Schedule. Then, click on the session you are interested in and you will see if there is an online draft proceedings available for viewing.

2018 AABP Awards

Boehringer Ingelheim
Bovine Practitioner of the Year
Dr. Henry Ceelen
Kemptville, Ontario

AABP Award of Excellence
Dr. Virginia Fajt
College Station, Texas

Zoetis Distinguished Service Award
Dr. Dan Thomson
Manhattan, Kan.

Merck Animal Health
Mentor-of-the-Year Award
Dr. Sheila McGuirk
Dodgeville, Wis.

Boehringer Ingelheim
Excellence in Preventive Dairy Medicine
Dr. Ben Shelton
Olin, N.C.

Boehringer Ingelheim
Excellence in Preventive Beef Medicine
Dr. John Crews
Ft. Meade, Fla.

Dr. James A. Jarrett
Award for Young Leaders
Dr. Eric Behlke
Okotoks, Alberta

Other awards given at the 2018 51st AABP Annual Conference include:

2018 AABP Research Summaries Graduate Student Awards

These awards are funded in part by the Bovine Respiratory Disease Symposium.

- **First Place:** Dr. Kelsey Paras, *Evaluation of composite vs individual fecal egg counts: Helping producers save money while accurately monitoring the resistance status of their parasites*
- **Second Place:** Ciara Hayes, *The effect of growth rate on reproductive outcomes in replacement dairy heifers in seasonally calving, pasture based systems*
- **Third Place:** Dr. Michael Kleinhenz, *The analgesic properties of transdermal flunixin meglumine when given at the time of castration*

2018 AABP Student Chapter and Faculty Advisor Awards

- **Student Chapter** – Iowa State University
- **Faculty Advisor** – Dr. Derek Foster, North Carolina State University

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2018 AABP Student Poster Competition

- **First Place:** Austin Ashbacher, Iowa State University, *Survey of bovine viral diarrhea control and prevention practices on dairy farms*

AABP Student Case Competition/ Research Presentation Winners

Overall Winner: Colleen Curtiss, Michigan State University

Clinical Case Report
- **First Place:** Kaitlyn Hess, University of Tennessee

Research Report
- **First Place:** Colleen Curtiss, Michigan State University
- **Second Place:** Sam Scheu, Colorado State University

2018 AABP Quiz Bowl Champions

Twenty-seven teams from 24 veterinary schools competed in the 2018 AABP Quiz Bowl. The winning team from the University of Georgia was comprised of Caitlin Quinn, Karen Taylor, Emily Vermillion and Scout Josey.

2018 AgriLabs Dr. Bruce Wren CE Awards ($5,000 each)

- (Beef) Dr. Nick Lemmel, Ogallala, Neb.
- (Dairy) Dr. Matt Weeman, Centreville, Md.

Dairy Quality Assurance Veterinarian of the Year

Dr. Clifford King, Jerome, Idaho, is the 2018 Dairy Quality Assurance Veterinarian of the Year, sponsored by Boehringer Ingelheim and the Dairy Quality Center.

Cattle Production Veterinarian Hall of Fame

Since 2011, the Cattle Production Veterinarian Hall of Fame has honored the exceptional veterinarians who have made lasting contributions to their profession. The Hall of Fame is sponsored by Merck Animal Health, AABP, the Academy of Veterinary Consultants and *Bovine Veterinarian* magazine. The 2018 inductees are:

- (Dairy) The late Dr. Leland Allenstein, Whitewater, Wis.
- (Beef) Dr. Del Miles, Greeley, Colo.

5K Stampede

J. Hunter Reed, Dryden, N.Y. was the overall and men's winner; Amanda Hardcastle, Knoxville, Tenn., was the women's winner and second place overall. See results at http://aabp.org/meeting/5K.asp.

AABP Foundation/Hoof Health Research Grant

AABP and the Hoof Trimmers Association co-sponsor this grant ($12,500 from each organization) for research in bovine lameness and hoof health.

2018 Grant Recipient: Dr. Sarah Wagner, North Dakota State University, *Topical salicylic acid treatment of digital dermatitis in dairy cows: Drug residues in milk and clinical efficacy*

Thank You

Dear Award Committee members,

It was an honor to receive the AABP Award of Excellence last week in Phoenix, and I am humbled to be the recipient of an award that has been given to several of my mentors and role models. I would like to publically thank my nominators, Drs. Sarah Wagner and Terry Lehenbauer, for their kind words and support. It is easy to spend time working for an organization like AABP because of the people who are involved!

Gratefully yours,
Dr. Virginia Fajt

Thank You

I would like to take this opportunity to thank AABP, the AABP Nominating Committee, the individuals who nominated me, and the many people over the years who have played a significant role in my career. A special thank you goes out to my wife and family who always supported me and my career as a veterinary practitioner, and to Dr. Ken Leslie of the Ontario Veterinary College, University of Guelph, for his revolutionary Dairy Health Management Certificate Program in the early 1990s which changed the focus from a sick animal and emergency treatment model to a performance and preventive model.

I have been very fortunate in my life in so many ways, key among them joining the veterinary profession. It is an honorable profession focused on the health and welfare of animals under our care, and filled with dedicated veterinarians serving roles in clinical practice, academia, government and in industry.

Receiving the AABP Practitioner of the Year award was a very humbling experience, and one that I will cherish for the rest of my life.

Finally, I would like to thank Boehringer Ingelheim for their sponsorship of the AABP Practitioner of the Year Award, and for their generous support of the veterinary profession.

Thank you all!
Dr. Henry J. Ceelen

AABP Reverts to 501c6 Classification

The American Association of Bovine Practitioners was incorporated in the state of Illinois as a 501c6 tax-exempt organization June 22, 1965. In 1991, the AABP Board of Directors decided to establish a separate 501c3 organization named the AABP Amstutz Scholarship Foundation. During the filing of the papers, the Amstutz Scholarship fund was inadvertently incorporated into the AABP organization and AABP was reclassified as a 501c3 tax-exempt organization. This mistake was recognized by the AABP Board of Directors at that time, and in 1993, an attorney was hired to proceed with an attempt to rescind the 501c3 action and re-establish AABP as a 501c6. The IRS refused to rescind the action and would not allow the transfer of assets out of the 501c3 to a 501c6. In 1996, under the leadership of Dr. Jarrett, an ad hoc committee was established and it was determined that AABP was primarily an educational organization that could remain as a 501c3.

When the AABP office was relocated to Ashland, Ohio, the new attorney for AABP questioned our classification as a 501c3. A review of historical documents was conducted and a recommendation to the AABP Board of Directors was made by an attorney in his firm that specializes in non-profit organizations. This attorney suggested that AABP is a trade association, not a charitable organization, and therefore, would be better organized as a 501c6, which was the original incorporated structure of AABP in 1965. Furthermore, with the formation of the AABP Foundation as a separate 501c3, the AABP already has a separate entity for carrying out the charitable activities of the organization.

Upon review, it was found that the vast majority of veterinary associations are organized as a 501c6 and AABP is one of a very few that are currently a 501c3. It is the view of the AABP Board of Directors that as the activities of the AABP evolve in the future, our members are best served by an organization with a 501c6 status. Therefore, the AABP Board of Directors authorized the attorney during the spring 2018 AABP Board of Directors meeting to file paperwork to establish AABP as a 501c6 organization while the AABP Foundation will carry out the charitable activities of the organization. The newly created AABP 501c6 has been established and will carry on the non-charitable activities of the organization. The AABP attorneys and accountant are providing oversight and the AABP will function seamlessly during this transition.

The AABP Board of Directors has put much effort into re-establishing the 501c6 tax-exempt status that our founding members originally intended when our organization was formed in 1965. It is the intent of the AABP Board of Directors to ensure AABP activities on behalf of members is consistent with our tax-exempt status as well as increase the funding and activity of our Foundation.

Any questions from the membership should be directed to fred@aabp.org.

AABP COMMITTEE REPORTS

Practice Meeting Guidelines

A recent graduate inquired about resources for implementing monthly staff meetings. He was concerned that without structure, the meetings would be a waste of time and digress into chit-chat sessions. He was correct and insightful that they could indeed be of little value.

To address this issue, Richard Stup, PhD, Agricultural Workforce Specialist Cornell Cooperative Extension, was contacted, as well as other AABP Veterinary Practice Sustainability Committee members. Stup, who works with AABP addressing human resource management issues, says that he always recommends developing a standing agenda for routine business meetings. Without a standing agenda, it falls to a busy leader to constantly come up with agenda items, and most times that will fizzle out after only a few meetings.

A standing agenda for a veterinary practice might look something like this:

Look back. Review briefly what happened last month. This could include financial reports or other key business metrics (client visits, appointments, etc.). Discuss what went well and what could have gone better. One common method for helping organizations assess the past is to do a situational analysis, or SWOT analysis. The SWOT acronym is shorthand for Strengths, Weaknesses, Opportunities and Threats. By breaking down the present situation and recent past performance into these categories, an organization can recognize what they do well, where there are opportunities to improve, what opportunities exist in their outside environment that they may be able to exploit, and what market forces and environmental factors may be detrimental to them over time. A well-done SWOT analysis should be inclusive, honest and based on any data and benchmarking available. When completed, it should give the organization a comprehensive evaluation of the present state of affairs facing them.

Look Ahead. What is coming up this month and what needs to happen for success.

Horizon Scan. What changes are happening in the industry/market that we need to be aware of? How can we plan for it? One tool to utilize is to do a value proposition analysis of your practice. This takes some time, so it may be an exercise that is undertaken outside of the team meeting. This tool will help you look at the needs of your clients from their viewpoint, and stratify needs into different categories such as technical services, consultation analysis/business planning, compliance/regulatory and service and product delivery.

Next, the needs may be separated into three degrees of essentiality. The "base" level includes those products and services that your practice must provide to meet minimal expectations in your local market area. You really cannot hold yourself out as a veterinarian without providing these offerings. The next fall into "Level 1", and those are the various benefits that can distinguish your practice from your competitors and be the basis for differentiation of your practice. This level often includes those offerings that are just starting to take hold in a market area such as IVF work, embryo transfer, etc. Finally, in "Level 2", you place those things that would be "home runs" if you could provide them and should include things you identified even if you do not know how to currently deliver them.

Last, services can be color-coded with green being presently offered services, yellow for services that the practice is attempting to provide but need some attention, and services in red are services the practice is not presently able to provide. A value proposition is just one tool that can help act as a road map and should be reviewed periodically as the management team moves forward, noting services that should be added or removed from the value proposition, and services that have changed color coding.

More information on constructing a value proposition can be found on the AABP website at http://www.aabp.org/resources/webinar_series.asp.

Make Assignments. Clearly assign responsibility and due dates for any actions items identified in the meeting. Assignments may take the form of plan statements that may be developed as issues are discovered that require development before they are to be addressed again in future sessions. Plan statements include an objective (what you are trying to achieve), a strategy (how you are trying to achieve it), and a plan (key actions, who is accountable to implement and milestone dates). Plan statements act as roadmaps, facilitating very clear communication and reference.

These four items could be the only things on a monthly agenda or they might just form the foundation and other items will create the full agenda.

Another best practice is to have a facilitator for the meeting. There is a need for someone to lead the meeting who can keep it organized, productive and moving forward. It does not have to be the most senior decision-maker; in fact, it is best if that person does not facilitate.

In the veterinary practice environment where scheduling is a challenge, it is important that a regular time be designated for the meetings, and the schedule should be cleared for all the stakeholders involved (particularly those Type A personalities), and all cell phones should be shut off except in the case of an emergency. Setting a timeline for discussions may be of value. Although they may not be strictly enforced, they may act as guidelines, and help keep the discussions on track.

If you do not presently hold regular practice meetings, please consider doing so. Open and honest communication and fact based discussions can return large benefits to a veterinary practice.

Submitted by the AABP
Veterinary Practice Sustainability Committee

CONTINUING EDUCATION

AABP Members Provided Free Online CE Through the Beef Cattle Institute

Through a collaborative agreement with the Beef Cattle Institute at Kansas State University, current AABP members can access presentations at no charge for the annual and recent graduate conferences as well as AABP webinars. You can view the presentation slides and listen to the audio from any computer, tablet or mobile device.

To view presentations, simply log on to the AABP website, click on the BCI purple cow logo on the left side of the home page and access the presentations. You can search by conference, speaker or topic. If you want to view the sessions for certified CE, simply take a quiz at the end of the presentation and you can print or store your CE certificate. This is a great new member resource that the AABP Board of Directors has funded. Member views have increase 400% since the board has supported this free CE and the web portal has been updated to a modern, searchable, user-friendly format.

An additional tool for online CE is the BCI Conference App. Download the free app by searching for BCI Conference in the Google Play Store or Apply iTunes store. Log in using your AABP member number and password, then store or download presentations. Please note that presentation slides are not available on the app (audio only) and certified CE is not available using the app. The app is a great way to learn the latest CE for bovine practitioners including the ever-popular research summaries. Take advantage of that windshield time between farm calls and get some AABP CE!

2018 Annual Conference presentations will be uploaded weekly in October on the BCI site. Stay tuned for presentations grouped by session to appear.

2019 AABP Recent Veterinary Graduate Conference Registration Opens in October

The second AABP Recent Veterinary Graduate Conference targeted for those veterinarians who have graduated between 2011 and 2018 will take place Feb. 7-9, 2019, in Columbus, Ohio.

The theme, “Break Through to Excellence”, was developed to offer newer graduates information and skills to improve their practice offerings. New to this conference will be three preconference seminars on Feb. 7. The program on Feb. 8-9 will include general, beef and dairy sessions, featuring topics for improving skills in clinical practice and business management.

More information will be available at www.aabp.org soon, and registration opens after Oct. 1.

BEEF

Veterinary Journal — July 2018
Vol. 237, pp. 34-36

Incidence and Characteristics of Juvenile Tarsocrural Osteochondrosis in Purebred Angus Bulls

S. Emerson*, T. Holt, S. Rao, L. Bass, R. Enns, M. Barrett

Osteochondrosis (OC) of the bovine tarsus has been suggested to contribute to osteoarthritis. The objective of this prospective cohort study was to provide data specific to the Angus breed. Clinical and radiographic exams evaluating OC lesions, effusion and osteoarthritis were performed in 50 purebred bull calves at three time points between 5.8 and 21 months of age. The likelihood of OC was lower at a median age of 12.4 months ($P < 0.001$), primarily due to resolution of distal talus changes ($P < 0.01$). Significant associations were observed between medial malleolus lesions and effusion at median age of 7.4 months ($P < 0.001$). This study suggests that clinical and radiographic screening performed at approximately one year of age may be beneficial in detecting tarsal OC lesions in Angus breeding herds.

* Department of Environmental Health and Radiological Health Sciences, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, Fort Collins, CO 80523

Prev Vet Med — September 2018
Vol. 157, pp. 50-58

Associations between a Decreased Veterinary Antimicrobial Use and Resistance in Commensal *Escherichia coli* from Belgian Livestock Species (2011–2015)

B. Callens*, M. Cargnel, S. Sarrazin, J. Dewulf, B. Hoet, K. Vermeersch, P. Wattiau, S. Welby

In this study the possible association between antibiotic use and resistance was explored, focusing on commensal Escherichia coli from livestock (veal calves, young beef cattle, pigs and broiler chickens) in Belgium between 2011 and 2015. A continuous decreasing trend in antibiotic use was observed for all classes, except for the phenicols. Antibiotic resistance of commensal E. coli significantly decreased for several of the tested antibiotics in all livestock species. A more rapidly reverted resistance was seen to 3rd/4th generation cephalosporins and fluoroquinolones. Moderate to strong correlations between antibiotic use and resistance were found, except for antibiotic resistance to chloramphenicol and gentamicin and the use of the corresponding antibiotic class. Yet, total antibiotic use was positively correlated with chloramphenicol resistance, showing the potential importance of co-selection for chloramphenicol resistance.

These results suggest that national antimicrobial usage reduction campaigns have beneficial effects on the overall resistance levels. Analyses were performed on small datasets, though, and care must be taken while making inference. For more detailed analysis, antibiotic use data at an animal species level are required.

*Centre of Knowledge on Antimicrobial Use and Resistance in Animals in Belgium, Victor Hortaplein 40/10, 1060, Brussels, Belgium

J Dairy Sci June 2018
Vol 101, No 6, pp 5115-5133

Effects of Nutrition on the Fertility of Lactating Dairy Cattle

R. Rodney*, P. Celi, W. Scott, K. Breinhild, J. Santos, I. Lean

This meta-analysis of 39 experiments containing 118 treatments explored the effects of diet interventions in early lactation on the proportion of dairy cows pregnant to artificial insemination (AI; pregnancy to AI) and on calving to pregnancy interval. It also identified factors that may explain variation in these responses. The objectives were to identify effects of diet on reproduction, rather than differences between specific dietary interventions. The examination of calving to pregnancy interval used the more traditional method of analyzing differences between a treatment and the reference treatment used for comparison within a given experiment. The systematic review identified fewer experiments (n = 39) than had been expected. Four different multivariable models including the random effect of experiment were used to examine the effects of CPM-Dairy (version 3.08) estimated diet and production variables on proportion pregnant to AI. These models examined (1) output of products, (2) balance or duodenal availability of nutrients, (3) intake of nutrients, or (4) percentage of nutrients in the diet. The multivariable models identified positive associations between estimated increased fatty acid intake [incidence rate ratio (IRR) = 1.0003 ± 0.0001g/d; ±standard error], starch intake (IRR = 1.061 ± 0.029 kg/d), metabolizable energy balance (IRR = 1.004 ± 0.002 MJ/d), and duodenal C14:0 (IRR = 1.008 ± 0.004 g/d) availability with the proportion of cows pregnant to AI, whereas rapidly fermentable sugar intake (IRR = 0.813 ± 0.054 kg/d), percentage of sugar in the diet (IRR = 0.960 ± 0.015%), and milk protein yield (IRR 0.922 ± 0.022 g/100 g per day) were associated with a reduced proportion of cows pregnant to AI. There was no multivariable model developed to assess variables associated with calving to pregnancy interval but, univariably, increased metabolizable energy balance was associated with a shorter calving to pregnancy interval whereas increased milk production was associated with longer time to pregnancy. Increased intake of some AA, particularly threonine and lysine, were associated with a longer calving to pregnancy interval. It is clear nutritional management around calving can influence reproductive success. The importance of dietary fats and increased energy and protein balances in early lactation for improved fertility outcomes is supported and suggests that starch and sugars may have different effects on the proportion of cows that are pregnant to AI. This work also highlighted a need for further focused field studies exploring the roles of specific fatty acids, AA, phosphorus, and carbohydrates on reproduction.

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Submitted by the AABP Reproduction Committee

Animal July 2018
doi:10.1017/S1751731118001830

Coupling a Reproductive Function Model to a Productive Function Model to Simulate Lifetime Performance in Dairy Cows

O. Martin*, P. Blavy, M. Derks, N.C. Friggins, F. Blanc

Reproductive success is a key component of lifetime performance in dairy cows but is difficult to predict due to interactions with productive function. Accordingly, this study introduces a dynamic model to simulate the productive and reproductive performance of a cow during her lifetime. The cow model consists of an existing productive function model (GARUNS) which is coupled to a new reproductive function model (RFM). The GARUNS model simulates the individual productive performance of a dairy cow throughout her lifespan. It provides, with a daily time step, changes in BW and composition, fetal growth, milk yield and composition and food intake. Genetic-scaling parameters are incorporated to scale individual performance and simulate differences within and between breeds. GARUNS responds to the discrete event signals ‘conception’ and ‘death’ (of embryo or fetus) generated by RFM. In turn, RFM responds to the GARUNS outputs concerning the cow’s energetic status: the daily total processed metabolizable energy per kg BW (TPEW) and the net energy balance (EB). Reproductive function model models the reproductive system as a compartmental system transitioning between nine competence stages: prepubertal (PRPB), anestrous (ANST), anovulatory (ANOV), pre-ovulating (PREO), ovulating (OVUL), post-ovulating (PSTO), luteinizing (LUTZ), luteal (LUTL) and gestating (GEST). The transition from PRPB to ANST represents the start of reproductive activity at puberty. The cyclic path through ANST, PREO, OVUL, PSTO, LUTZ and LUTL forms the regime of ovulatory cycles, whereas ANOV and GEST are transient stages that interrupt this regime. Anovulatory refers explicitly to a stage in which ovulation cannot occur (i.e. interrupted cyclicity), whereas ANST is a pivotal stage within ovulatory cycles. Reproductive function model generates estradiol and progesterone hormonal profiles consistent with reference profiles derived

from literature. Cyclicity is impacted by the GARUNS output EB and clearance of estradiol is impacted by TPEW. A farming system model was designed to describe different farm protocols of heat detection, insemination, feeding (amount and energy density), drying-off and culling. Results of model simulation (10 000 simulations of individual cows over 5000 days lifetime period, with randomly drawn genetic-scaling parameters and standard diet) are consistent with literature for reproductive performance. This model allows simulation of deviations in reproductive trajectories along physiological stages of the cow reproductive cycle. It thus provides the basis for evaluation of the relative importance of different factors affecting fertility at individual cow and herd levels across different breeds and management environments.

* UMR 0791 Modélisation Systémique Appliquée aux Ruminants, INRA, AgroParisTech, Université Paris-Saclay, 75005 Paris, France

Submitted by the AABP Reproduction Committee

J Dairy Sci August 2018
Vol 101, No. 8, pp 7575-7584

Effect of Milk Production on Reproductive Performance in Dairy Herds

R. Rearte*, S. LeBlanc, S. Corva, R. de la Sota, I. Lacau-Mengido, M. Giuliodori

The objective of the present study was to assess the relationship between individual cow milk yield and fertility, accounting for the contextual effect of the herd. A data set including 657,968 lactations from 677 dairy herds in Argentina from 2001 to 2012 was used. The odds of pregnancy by 100 d in milk (DIM) were assessed by a multilevel logistic model (with cow as the first and herd as the second hierarchical level), and time to pregnancy was assessed by a proportional hazards regression model. Multilevel logistic models included the fixed effects of milk yield by 80 DIM, parity, year, and calving season at cow level and quartiles of herd milk yield by 80 DIM as a contextual effect. The proportional hazards model included the effect of daily cow-level milk yield as time-dependent variable, with milk yield at herd level as the stratification variable. Cows producing 1 standard deviation over the mean milk yield of their herd had 1.3 percentage point lower pregnancy by 100 DIM (from 31.4 to 30.1%; odds ratio = 0.942) when in herds in the top quartile of milk yield, whereas they increased 0.5 percentage points (from 27.9 to 28.4%) when in herds in the lowest quartile of milk yield. Only 4% of the observed variation in pregnancy by 100 DIM was explained by the random effect of the herd. Similarly, cows producing 1 standard deviation (8 kg/d) greater than the herd mean daily milk had 1.3% lower hazard of pregnancy (hazard ratio = 0.987) at 63 DIM in herds in the top quartile of milk yield, whereas they had 14.8% higher hazard (hazard ratio = 1.148) in herds in the lowest quartile of milk yield. The magnitude of the negative association between the cow's daily milk yield and the hazard of pregnancy increased with DIM. In conclusion, the relationship between milk yield and reproductive performance is statistically significant, but the effect size is practically small and is modulated by herd production level.

* Cátedra de Higiene, Epidemiología y Salud Pública, Facultad de Ciencias Veterinarias-Universidad Nacional de La Plata, La Plata, B1900AVW, Argentina

Submitted by the AABP Reproduction Committee