



Newsletter

AMERICAN ASSOCIATION OF BOVINE PRACTITIONERS

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THE PRESIDENT'S MESSAGE

Carbon Comments

When I leave the comfortable confines of rural America and take trips requiring air travel, I prefer to use this time to read and work on neglected projects that are hard to accomplish in the day-to-day busy work and family schedule. I would not be considered an "overly friendly traveler." Inevitably though, I'll sit with someone who wants to chat.

A typical interaction with someone from an urban background might go something like this: Passenger, "What do you do?" My short answer, "I'm a veterinarian." "Oh, really," says the suddenly animated passenger, "I have two poodles and three cats. One of my poodles keeps scratching at his ear ..." I quickly reply, "Well, I'm primarily a cattle veterinarian, and I mostly work with beef cattle." Passenger: "Really, I didn't know cows had veterinarians. I'm trying to cut down on my meat consumption because I'm really concerned about our planet. Don't cows contribute a lot to the global warming problem? Seems like I read something about that on Facebook."

Ever had one of these conversations? You might expect more in the future. Where do we begin with these types of interactions? Unfortunately, there's not a short "elevator" speech that seems adequate to address the widespread misunderstandings of animal agriculture by the public.

Less than two percent of our population is involved in agriculture, and cattle-focused veterinarians make up only a tiny fraction of this number. Most people are not familiar with what we do, yet numerous surveys over the years have shown people rank veterinarians very high when rating different professions with which they interact.

As bovine veterinarians, we have provided valuable contributions in improving animal health and well-being of the cattle under our care. Through sound health management practices, improved nutrition and enhanced cow comfort, the cattle we oversee have increased their efficiency and productivity. We have an exciting story to tell, especially to our non-agricultural friends and acquaintances.

In 2017, our national cattle herd produced 26.2 billion pounds of beef with 90 million head of cattle. An equivalent amount of beef production in 1975 required 144

million head (a 53% larger herd size). The United States provides 20% of the world's beef supply with only six percent of the world cattle population. Sixty percent more milk is produced today in the U.S. compared to 1950, even with a reduction in dairy cow numbers from 24 million to nine million. The carbon footprint for a glass of milk is approximately one-third of what it was 70 years ago.



The 2006 FAO Report, "Livestock's Long Shadow", stated that livestock produce 18% of all anthropogenic greenhouse gases (GHG) globally, and, in this report, it was even higher than transportation. Though the flawed methodology used in this exaggerated report has been exposed and retracted, this figure is still erroneously quoted. The EPA puts GHG emissions from U.S. livestock at three to four percent.

Through the combination of sustainable intensification and low-input livestock grazing systems, the U.S. livestock industry is one of the most efficient and lowest environmental impact systems in the world. It has been estimated that 86% of what livestock eat globally is inedible by humans. Most North American beef cattle reside in the cow-calf sector and the average beef animal spends 90% of its life on grass. Well-managed grazing operations increase the capacity of soil carbon sequestration. A healthy rangeland environment not only tolerates the existence of hooved livestock, it is enhanced by them.

Research throughout the last century has shown that dairy and beef cattle provide nutrient-dense products that promote health and help prevent human nutrient deficiencies.

In mid-January, the EAT-Lancet Commission: Food, Planet, Health published a report in *The Lancet*, "Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems". The report calls for up to a 90% reduction in beef and pork consumption and a drastic reduction in dairy product consumption, ostensibly for improved health and the good of the planet. This group is reportedly very well-funded and aggressive in their

strategy to promote this agenda through a variety of media and educational venues. Specifically, the report recommends red meat intake of zero to 28 grams per day, poultry intake of zero to 58 grams per day, fish intake of zero to 100 grams per day, dairy foods intake of zero to 500 grams per day and nut intake of 50 grams per day.

Dr. Sara Place, Senior Director of Sustainable Beef Production Research for the National Cattlemen's Beef Association, states the following: "Calls for individuals to eliminate or severely limit foods, especially animal-sourced foods that are desirable, nutrient-rich and provide nutrients essential to human life that cannot be found in plants, are unlikely to scale to significant change. Our practical answer lies in making the food system better – the whole plate, from plant to animal-sourced foods – rather than removing nutrient-rich foods from people's plates. Keys to this process are sustainable intensification, decreasing food waste and losses, and enhancing nutrient recycling in our agricultural systems. Sustainable intensification is increasing the productivity of agriculture while paying attention to key societal issues such as animal welfare and rural livelihoods."

"Making the food system better" is the space we operate in daily as cattle veterinarians. The Veterinarian's Oath, which we all swore to uphold on receiving our license, contains language applying directly to food supply veterinary medicine, such as the "conservation of animal resources", "the promotion of public health", the "protection of animal health and welfare" and "the prevention and relief of animal suffering."

As agricultural leaders, animal health management advisors and hands-on bovine veterinary professionals, we will be asked to provide our opinions on the *EAT-Lancet* report, especially by our non-agricultural friends and acquaintances. We need to become more involved in spreading the good word about animal agriculture, including the nutritional benefits of animal protein, the positive impact on grassland ecosystem management, and the relatively low and improving carbon footprint of the ruminants under our care.

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
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World Association for Buiatrics

2020	Madrid, Spain	September 13 – 18
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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:

- Ohio Dairy Veterinarians Meeting, Columbus, Ohio – Executive Vice President
- AVMA Veterinary Leadership Conference and House of Delegates Meeting, Chicago, Ill. – Executive Vice President, AVMA Delegate Dr. Brian Gerloff, President Dr. Glenn Rogers
- National Milk Producers Federation Animal Health & Well Being Committee Meeting, Fort Lauderdale, Fla. – Executive Vice President
- National Cattlemen's Beef Association Annual Convention, New Orleans, La. – Executive Vice President, President Dr. Glenn Rogers



AABP NEWS

Hatcher to Become Tennessee Secretary of Ag

Dr. Charlie Hatcher, longtime AABP exhibits manager and the current state veterinarian of Tennessee, has been appointed by newly elected Tennessee Governor Bill Lee as the incoming Tennessee Secretary of Agriculture.

Hatcher is also a well-known dairy producer at the Hatcher Family Dairy in College Grove, Tenn. His daughter and AABP member, Dr. Jennifer Hatcher, practices at the family's veterinary practice located next to their dairy.

AABP would like to thank Charlie, Sharon and the entire Hatcher family for their work over several years to manage AABP's growing trade show at its annual conference, and wishes Charlie success in his new position.

Seeking AABP Junior Delegates

The AABP Student Delegate program recognizes veterinary student leaders throughout North America and the Caribbean, and provides crucial early exposure to leadership and service opportunities within AABP that will carry over into early practice for these future veterinarians. It is a three-year program for a veterinary student at each veterinary school starting in the junior year, continuing through their senior year, and finishing with their first year out of veterinary school.

Junior delegates are assigned to an AABP committee to become familiar with committee functions, the organization

and have networking opportunities with members. Junior and senior delegates receive a \$500 stipend to attend the AABP Annual Conference. The recently graduated delegate in his/her third year of the program receives complimentary registration to the AABP Annual Conference.

Each veterinary school may have one junior delegate, one senior delegate and one recent graduate delegate each year. The intent of the AABP Student Delegate program is that a single student from each school begins the program as a third-year student and continues in this role for the three years of the program. Once the junior delegate has been selected and has attended the AABP Annual Conference as junior delegate, no substitutions will be allowed.

For new junior delegates in 2019, your school's junior delegate will graduate in the class of 2021. Delegates must be AABP student members (not just a member of your student chapter). If your delegate is not a current member, he/she can join at <http://aabp.org/store/paydues.asp>.

Senior delegates (last year's junior delegate) and faculty reps can send their junior delegate's name to gwren@aabp.org.

AABP Genomics Webinar Series

The AABP Genomics Committee will present two more genomics webinars in February and March. The first webinar by Dr. George Wiggans, "Heritability and Impact of Genomics in Dairy Cattle," was held Jan. 16.

Upcoming webinars:

- February 6, 2019, 4:00pm EST, Dr. Tom Lawlor, "Indexes and Their Impact on Selection in the Dairy Industry". Join the webinar at <https://global.gotomeeting.com/join/536327485>
You can also dial in using your phone. United States: +1 (872) 240-3311, then enter the access code: 536-327-485.
It is recommended to log on to the meeting 5-10 minutes before the scheduled start time, and it is also recommended to do a system check before the meeting to make sure your computer is configured to display the webinar by visiting <https://link.gotomeeting.com/system-check>.
- March 20, 2019, 4:00pm EST, Dr. Albert DeVries, "Genomic Strategies and Economic Outcomes". Access information/link for this webinar will be available in the March newsletter.

All of the webinars are RACE-approved for 0.50 hours continuing education credit in jurisdictions that recognize RACE approval. Please make sure you log in to the webinar with your first and last name so that the AABP office can issue a CE certificate to you.

Miss a webinar? The webinars will be available on the BCI AABP CE portal for future viewing. Download the BCI Conference App in the Google or Apple store to listen and view conference presentations on the go.



DEADLINE REMINDERS

Call for AABP Abstracts Research Summaries and Scientific Poster Sessions 2019 52nd AABP Annual Conference

The 2019 52nd AABP Annual Conference, Sept. 12-14 in St. Louis, Mo., will feature scientific sessions focused on cutting-edge research that is directly applicable to the health, welfare and productivity of cattle and food and environmental safety associated with cattle production. These sessions allow researchers from around the world to disseminate state-of-the-art information to bovine practitioners to improve the cattle industry.

Research projects having direct application to bovine practitioners are being solicited for presentation at the Oral and Scientific Poster Sessions for the 2019 Annual Conference. Project summaries focused on all areas of bovine health, welfare and production are welcome, including pharmacology, epidemiology, medicine, surgery, economic analysis, pathology, preharvest food and environmental safety, diagnostics, and health monitoring. Projects should have relevance to bovine practitioners and may be broadly applicable to the cattle industry, or more specifically applicable to the beef or dairy industry.

Oral presentations made by graduate students in the AABP Research Summaries will be eligible to compete in the AABP Graduate Student Research Summary Presentation competition. The top three presenters from the graduate student competition will receive cash awards.

To be considered for the AABP Research Summaries (either the oral or poster sessions) and publication in the Annual Conference proceedings, your abstract must be submitted electronically **by April 15, 2019**. The submission site is open now. For more information and to submit an abstract, go to www.aabp.org and select the Conference link at the top of the page, then click on the Abstract Submission link located in the submenu.

For questions, contact Dr. Edouard Timsit (eftimsit@ucalgary.ca) or Dr. Chris Chase (christopher.chase@sdstate.edu).

Call for AASRP Abstracts Small Ruminant Research Summaries AASRP Meeting at 2019 52nd AABP Annual Conference

The 2019 52nd AABP Annual Conference, Sept. 12-14 in St. Louis, Mo., will feature a scientific session focused on small ruminant research applicable to the health, welfare and productivity of goats, sheep, camelids or farmed deer.

Research projects having direct application to small ruminant practitioners are being sought for the Oral Session on Friday, Sept. 13. Each presentation should be limited to 15 minutes. Faculty, graduate students, practitioners or

veterinary students are urged to share information with practitioners.

Project summaries focused on all areas of small ruminant health, welfare and production are welcome including pharmacology, epidemiology, medicine, surgery, economic analysis, pathology, preharvest food and environmental safety, diagnostics, and health monitoring. Projects should have relevance to practitioners and may be broadly applicable or more specifically applicable.

A \$1,000 cash prize will be awarded to the winning oral presentation if there are at least three graduate student oral presentations in the AASRP session.

Abstract submissions for the Small Ruminant Research Summaries session must be submitted electronically to AABP by **April 15, 2019** for consideration. The submission site is open now. For more information and to submit an abstract, go to www.aabp.org and select the Conference link, then Research Summaries-AASRP for the Abstract Submission link located in the submenu.

For questions, contact Dr. Fred Gingrich (fred@aabp.org) or Dr. Patty Scharko (pschark@clemson.edu).

Call for Abstracts Student Case Presentation Competition 2019 AABP 52nd Annual Conference

The AABP Program Committee seeks abstract submissions for the Student Research/Clinical Case Presentation Competition to be held Thursday, September 12, 2019, at the 52nd AABP Annual Conference in St. Louis, Mo.

The purpose of the competition is to promote student interest in the AABP, encourage development of investigative and communicative skills, and allow veterinary students to actively participate in the annual meeting program. Students at any level in their veterinary program, as well as those who have graduated within six months prior to the competition, are eligible. Graduates should try to ensure that prospective employer(s) will allow meeting attendance.

All submissions for the 2019 Student Case Presentation Competition should be submitted online at www.aabp.org/students/case by **February 28, 2019**.

Abstracts for submission will be limited to 250-300 words. All required information can be submitted via the website; receipt of submissions will be confirmed by email. Ten presentations will be selected. Notification will be made by March 31, so that adequate time is available for travel and class/clinic coverage arrangements. Further instructions will follow for those selected.

Presentations will fall into the categories of either Research Reports or Clinical Case Reports, however, research projects should not be part of a graduate program. Students enrolled in masters or doctoral graduate programs should submit their abstracts to the Research Summaries portion of the program. Clinical cases submitted should be practical and representative of those most likely to be encountered with some frequency by recent graduates. Clinical cases observed on externships at private veterinary

practices as well as in academic settings are encouraged. The research entries should be applied in nature and directly undertaken by the presenter. Submissions which adhere to these guidelines will receive higher rankings during the selection process. In 2019, AABP will provide \$500 in travel stipends to the selected presenters.

Contestants will be judged on the quality of their case investigation or research and their presentation. Three or four awards will be made, according to the number of entries in each of the two categories, Research and Clinical Case. For a category involving four or fewer entries, one award of \$1,500 will be provided. For a category involving five or more entries, a first place award of \$1,500 and a second place award of \$750 will be presented.

No more than one student may be involved with the submission or presentation of a case or research project, therefore abstracts submitted with multiple names of presenters will not be considered. Please contact your AABP faculty representative for more information and for assistance in preparing your abstract. You may also contact Dr. Keelan Lewis keelanrosea@gmail.com or Dr. Fred Gingrich at fred@aabp.org.

Student Externship Program

Do you know a promising student who is interested in food animal medicine? Are you a student looking for an externship or in need of help to fund an externship? Apply for the AABP Student Externship Program. It's a scholarship to enable students with an interest in bovine medicine to use their summers and school breaks to gain experience in the field.

Applications for funding are available on the AABP website at www.aabp.org/students/asep.asp. You can also find the information in the Student section under AABP Grants/Scholarships. You can submit your application and reference letters from faculty members online. We have also added an online database of clinics interested in hosting students under the Externship Opportunities section of the website (there is a link from the Student section of the AABP website).

For more information, contact the AABP headquarters at 800-269-2227 or Fred@aabp.org. **The deadline for applications for externships occurring between May 1, 2018 and October 31, 2018 is April 1, 2018.**



NEW MEMBERS

Find Out Who Has Joined AABP!

Do you want to know who has joined AABP in the last month? Then log onto the AABP website at www.aabp.org, and under the Members tab select "View New Members". You can also search for existing members under the Members tab by clicking on "Search for a Member".



AABP COMMITTEE REPORTS

New Benefit-Cost Ratio BSE Spreadsheet Available on AABP Website

AABP members can access a new Excel spreadsheet developed by Dr. Doug Richardson, an AABP member from Athens, Texas, and Dr. Jim McGrann, Texas A&M AgriLife Extension Service professor emeritus. This spreadsheet, "Benefit-Cost Ratio Analysis of Performing a Herd Bull Breeding Soundness Examination", allows veterinarians and producers to calculate the benefit-cost of performing bull breeding soundness examinations, evaluate the impact of delayed pregnancy on weaning weights and gross calf revenue, and assess the cost of bull ownership.

This spreadsheet provides veterinarians the opportunity to discuss the value of bull breeding soundness examinations with their clients which is timely in light of the recent revisions to the Society for Theriogenology's BSE guidelines.

The spreadsheet is available on the AABP Beef Health Management Committee page. You must be logged onto the website to view the spreadsheet. Visit www.aabp.org, and under the Home tab under Committees, click on Committee Pages, then select the Beef Health Management Committee. If you are already logged on to the website, click this link to take you directly to the spreadsheet <http://aabp.org/members/Beef%20Health%20Management.asp>.

Submitted by the AABP
Beef Health Management Committee

Production-based Pay Considerations

Often in the discussion of ProSal or commission payment systems in veterinary practices, we encounter folks who are very loyal to the idea that all associates on ProSal should be paid 20% \pm 1-3 %. While this range of percentages comprises 99% of quotations on the topic, it is totally inappropriate for most ambulatory food animal practices.

Adding to the confusion is an emotional statement that if you employ an associate to do farm animal practice, you should (do him or her a favor and) pay a higher percentage such as 35-50% commission.

Decisions about associates pay should be made based on the economics of the situation taking into account a strict accounting of the expenses of hiring an associate, expenses related to his or her provision of the services, as well as the income generated. No percentage will fit all practices.

Various issues influence the commission-based pay scale, including professional hourly charge, billable hours, technical assistance on calls and proper application of managerial accounting procedures.

Most often, managerial accounting issues are related to the allocation of expenses. If there is a four-doctor practice, ABC Practice, with two doctors doing companion animal

practice and two doing strictly ambulatory cattle practice, it's reasonable to ask how the various expense are allocated. If all expenses are allocated on a per-doctor basis or as a percent of gross income, one is liable to allocate expenses in an incorrect fashion and make faulty decisions. For example, the cost of rent, phone, support staff, building heat, promoting and advertising and insurance may be predominantly allocated to the companion-animal portion of a mixed-animal practice, while vehicle expenses in a mixed-animal practice may be allocated to the food-animal portion of a mixed-animal practice.

In addition, the cash flows of a companion-animal practice and a dairy practice are very dissimilar. A dairy practice charges for time, drugs are sold at minimal markup, and most of the income is generated by the doctors. In a companion-animal practice, the doctor is responsible for a much smaller piece of the pie, with much of the income generated by support staff and the sale of product at higher margins than seen in a cattle practice.

When food-animal practice owners develop a commission-based pay scale, the issues of call fees and drug dispensing are often considered. Some owners do not include call fees in the calculation, concluding that they are not making anything on call fees anyway, while others include call fees in the calculation, rationalizing that even though the margins from call fees are low, the associate should receive something for "windshield" time. In food-animal practices, zero to 10% of sales, either total sales or total sales minus purchase price (gross margin), are included as contributors to the commission.

To come to an appropriate percent that will satisfy you and your associate, you need to have a proper perspective of the expenses of each of the segments of the practice.

In the ABC Practice with the cattle practitioners that are billing by the hour and generating income that addresses only the necessary portion of the fixed expenses with minimal overhead, the cattle practitioners may be paid 35-50% of income generated from services and still generate a healthy earnings before interest, taxes, depreciation and amortization. At the same time, the companion-animal practitioner should be paid 20% of total sales including services and product, due to the associated expenses including higher support staff.

If you are considering a production-based pay scale, it is wise to take into account all expenses and allocate while always answering the question, "Is this expense necessary for this portion of the practice to continue, or would it be eliminated if that portion were discontinued?" If the answer is that the expense would be continued, then little or none should be allocated to that segment. If the answer is that the expense would go away, then the expense should be totally allocated to that enterprise.

If you are considering implementing a commission-based salary scale, you should do a careful analysis of your income streams and expense allocation, performing a sensitivity analysis of how it would look if there were changes in the marketplace and/or employee behavior.

Submitted by the AABP
Veterinary Practice Sustainability Committee



Seroprevalence of Bovine Anaplasmosis in Georgia

C. Okafor*, S. Collins, J. Daniel, J. Coetzee, B. Whitlock

Anecdotally, Veterinary Feed Directive prescriptions in many states in the southeastern United States (U.S.) are written most often for treatment and prevention of bovine anaplasmosis (BA). This tick-borne disease of cattle caused by *Anaplasma marginale* remains an economically important disease in U.S. However, there are no prevalence estimates of this disease in Georgia (GA). Thus, this study was aimed at determining the seroprevalence of BA in GA. In an active cull beef cow screening for BA, 293 beef cows were sampled from one cattle auction barn and one slaughterhouse between May 2013 and September 2014. These cows originated from 6 of 159 counties in GA. The top 3 counties sampled were Gordon (241 samples), Carroll (25 samples), and Emanuel (12 samples). Of the 293 sampled beef cows, 13 were positive and 280 were negative for BA. Hence, with competitive ELISA, the overall observed apparent seroprevalence of BA in GA was 4.44% (95% CI: 2.61–7.44%) while the estimated true seroprevalence was 2.62% (95% CI: 5.2–5.87%). The top 2 prevalent counties were Carroll and Gordon with apparent seroprevalence of 8% (95% CI: 2.22–24.97) and 4.78% (95% CI: 2.69–8.36), respectively and estimated true seroprevalence of 6.45% (95% CI: 0–25.37) and 2.99% (95% CI: 0.54–6.89), respectively. Although not significant, counties with specimen submissions for BA testing had a greater cattle population and number of cattle farms than counties without specimen submissions. Nevertheless, future prevention and control measures for BA should out of caution target counties with ≥ 5000 total cattle heads.

* Biomedical and Diagnostic Sciences, College of Veterinary Medicine, University of Tennessee Institute of Agriculture, Knoxville, TN 37996

This research was funded by the AABP Foundation through the 2012 Competitive Research Grant Award. If you would like to support this clinically relevant research, please consider a donation to the Foundation. You can donate online at <https://aabp.org/foundation/donate.asp>.



Extended Lactation in High-yielding Dairy Cows.

I. Effects on Reproductive Measurements

G.Niozasa*, G.Tsousis, I.Steinhöfel, C.Brozos

The objective of this prospective field study was to evaluate the effects of extending the lactation period on various reproductive measurements of high-yielding Holstein cows. On 40 d in milk (DIM), cows were gynecologically examined (transrectal palpation, sonography, vaginoscopy). Cows without signs of clinical endometritis were blocked by parity and were randomly allocated to 1 of 3 experimental groups with a voluntary waiting period (VWP) of 40, 120, and 180 d, respectively (G40, n = 135; G120, n = 141; G180, n = 139). Cows of G120 and G180 were reexamined at the end of the VWP. If natural estrus was detected within 46 d after the end of the VWP, an artificial insemination was performed. If no estrus was detected, the respective cows were synchronized by applying the classical Ovsynch protocol. We found no difference in the proportion of cows in which estrus was detected between 40 to 86 DIM or in the days to first estrus between the 3 groups. Estrus detection in this period was lower in cows with body condition score < 3 on 90 DIM compared with body condition score ≥ 3 (61.5 vs. 76.0%) and in cows with high energy-corrected milk production (ECM) on 92 DIM [58.6 vs. 70.1%, for cows with higher and lower than the median (39.9 kg) ECM, respectively]. The proportion of cows that estrus was detected within 46 d after the VWP was greater in G120 (88.9%) and G180 (90.8%) compared with G40 (70.4%). These effects were more apparent in cows with high ECM. The rate of estrus detection and of becoming pregnant in this period was greater for G120 (hazard ratio = 2.2 and 1.6, respectively) and for G180 (hazard ratio = 2.4 and 1.8) compared with G40. Cows in both groups with extended lactation had greater overall first service conception rates (G120 = 48.9%; G180 = 49.6%) and a lower number of services per pregnant cow (G120 = 1.56 ± 0.1 ; G180 = 1.51 ± 0.1) compared with G40 (36.6%; 1.77 ± 0.1). We observed no difference in pregnancy loss or in the proportion of cows culled up to 305 d of lactation between the 3 groups. The number of Ovsynch protocols per 1,000,000 kg of ECM was reduced by 75% in G180 and by 74% in G120 compared with G40 (5.9 vs. 7.1 vs. 25.1). In conclusion, extending the lactation of dairy cows can improve main reproductive measurements in high-yielding cows.

*Clinic for Cattle, University for Veterinary Medicine, 30173 Hannover, Germany

**Extended Lactation in High-yielding Dairy Cows.
II. Effects on Milk Production, Udder Health
and Body Measurements**

G.Niozasa*, G.Tsousis, I.Steinhöfel, C.Malesios

The objective of this prospective field study was to evaluate the effects of extending the lactation period of high-yielding dairy cows on milk production, udder health characteristics, and development of body condition. On 40 d in milk (DIM), an examination of the genital tract (transrectal palpation, sonography, vaginoscopy) was performed. Cows without signs of clinical endometritis were blocked by parity and were randomly allocated to 1 of 3 experimental groups with a voluntary waiting period of 40, 120, and 180 d, respectively (G40, n = 135; G120, n = 141; G180, n = 139). Mean daily milk and energy-corrected milk production did not differ between the 3 groups regarding the first 305 d or for the whole lactation (d 1 and up to dry off, culling, or 600 DIM). In late lactation (306 to 600 DIM), G40 had lower average productivity (23.8 kg) compared with G120 (26.5 kg), with G180 showing intermediate values (25.7 kg). The extended lactation groups showed greater persistency, as the rate of decline based on a Wilmlink function was lower for G120 ($c = -0.063$ and -0.045 for milk and energy-corrected milk, respectively) and G180 ($c = -0.061$ and -0.047) compared with G40 ($c = -0.071$ and -0.056). We found no difference between the 3 groups regarding the evaluated udder health characteristics (somatic cell count, incidence of mastitis, and days off milk due to mastitis). More cows in G180 (7.9%) were culled due to low productivity compared with G40 (0.7%) and as a tendency compared with G120 (2.8%). Moreover, cows of G180 showed higher median body condition score at the time of dry off compared with cows of both G40 and G120 (3.50 for G180 vs. 3.25 for both G40 and G120). At the time of dry off, G180 cows also had greater backfat thickness (25.0 mm) compared with both G40 (22.2 mm) and G120 cows (21.6 mm). Based on our results, the extension of the voluntary waiting period of high-yielding cows up to 120 d has no adverse effects regarding milk production, involuntary culling, udder health, or BCS gain.

*Clinic for Cattle, University for Veterinary Medicine, 30173 Hannover, Germany



BEEF

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**Cell-Mediated and Humoral Immune Responses to
Bovine Herpesvirus Type 1 and Bovine Viral Diarrhea
Virus in Calves Following Administration of a Killed-
virus Vaccine and Bovine Herpesvirus Type 1 Challenge**

T. Van Anne, C. Rinehart, R. Buterbaugh, M. Bauer, A.
Young, M. Blaha, A. Klein, C. Chase*

The objective of this study was to evaluate cell-mediated and humoral immune responses of calves receiving 2 doses of a dual-adjuvanted vaccine containing inactivated bovine herpesvirus type 1 (BHV1) and bovine viral diarrhea virus types 1 (BVDV1) and 2 (BVDV2) before and after exposure to BHV1. Twenty-four Holstein steers negative for anti-BHV1 antibodies and proliferative cell-mediated immune responses against BHV1 and BVDV were randomly assigned to 3 groups. The vaccinated group (n = 10) received 2 doses of vaccine on days 0 and 21. Control (n = 10) and seeder (4) groups remained unvaccinated. Calves were commingled during the study except for the 3-day period (days 53 to 55) when seeders were inoculated with BHV1 (1.04×10^7 TCID₅₀, IV) to serve as a source of virus for challenge (days 56 through 84). Rectal temperature and clinical illness scores were monitored, and blood and nasal specimens were obtained for determination of clinicopathologic and immunologic variables. After BHV1 challenge, mean rectal temperature and clinical illness scores were lower for vaccinates than controls. In vaccinates, antibody titers against BHV1 and BVDV2, but not BVDV1, increased after challenge as did extracellular and intracellular interferon- γ expression, indicating a T helper 1 memory response. Additional results of cell marker expression were variable, with no significant increase or decrease associated with treatment. Calves administered 2 doses of a killed-virus vaccine developed cell-mediated and humoral immune responses to BHV1 and BVDV, which were protective against disease when those calves were subsequently exposed to BHV1.

* Department of Veterinary and Biomedical Sciences, College of Agriculture and Biological Sciences, South Dakota State University, Brookings, SD 57007

**An Overview of Claw Disorders at Slaughter
in Finishing Beef Cattle Reared in
Intensive Indoor Systems through a
Cross-sectional Study**

L. Magrin *, M. Brscic, L. Armato

This cross-sectional study aimed to assess in post-mortem the prevalence of specific claw disorders and their location on the sole in hind feet of finishing beef cattle reared indoors under intensive production systems. Evaluation was made on animals that were introduced in the ordinary slaughterhouse planning, presumably with no signs of impaired locomotion or severe lameness. A total of 4292 hind feet (right and left) belonging to 153 batches were collected (average feet/batch 28.1 ± 5.62 (SD)) in 3 abattoirs in Northern Italy at 3 time points (April-June and September-October 2016; February-March 2017). One veterinarian performed the claw trimming first and then scored the presence of specific claw disorders and their position on the sole considering 7 zones (in the digital and interdigital areas). All claw disorders in a specific zone were recorded as binary (presence/absence). Infectious (ILS), non-infectious (NILS), and global (GLS) scores were calculated considering both the type of claw disorder detected and the number of zones affected. Non-infectious

disorders were the most common diagnoses among batches, mainly on the lateral claws and in the heel-sole junction area. In particular, white line abscesses and ulcers (sole and toe ulcers) were also found as two of the most debilitating and painful lesions with a non-negligible frequency.

Infectious diseases, when occurring in a batch, spread to almost all feet. As expected, GLS distribution on the total feet inspected showed a non-harmful condition, given that the worst scores from 3 to 13 were assigned to a restricted sample of feet (15%) and were far from the maximum potential value of 50. However, the GLS of all batches monitored revealed 10 critical batches having no healthy feet or more than 50% of feet graded with the worst scores. Since right and left feet of the same animal showed similar clinical diagnoses, a more efficient claw health evaluation system should consider only one foot.

Although all cattle inspected were supposed to have no evident locomotory problems before slaughter, the detection of several foot disorders and the considerable distribution in some batches might suggest poor conditions on farms affecting finishing beef cattle health, behaviour, and welfare. It is therefore advisable that possible predisposing factors of specific claw disorders on the farms of origin be investigated more deeply.

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