

ARSBC 2012: Vaccination and Pregnancy Determination

Pregnancy Detection Beyond Palpation

MU professor explains four methods to determine pregnancy earlier in the breeding season.

by Kasey Miller, associate editor

Wouldn't it be handy to know if a cow was pregnant sooner after insemination, so open females could be re-synchronized and artificially inseminated (AI) the second time earlier in the breeding season? Matt Lucy, professor of animal science at the University of Missouri (MU), explained that four tests using new technology to detect pregnancy earlier are in the works.

1. The first test, called Early Pregnancy Factor (EPF), looks at an immunosuppressive glycoprotein in the blood and is supposedly able to detect pregnancy two days after breeding. A pregnancy kit was brought to market in the 1990s, Lucy said, but three different studies found the kit to be unreliable.

2. The second measures interferon-stimulated gene (ISG) expression. This claims to detect pregnancy by day 16-18, though Lucy said it is more accurate at 20 days. The test uses a process called reverse-transcriptase PCR (RT-PCR) to analyze RNA from leukocytes in the blood. Lucy noted that ISGs have not been commercialized.

3. The third option is progesterone monitoring of blood or milk. Lucy said this is more popular in dairy cattle. The first true example of chemical testing, it detects whether a decrease in progesterone (meaning the cow is not pregnant) has occurred 21 days after breeding. However, since multiple samples increase likelihood of accuracy (and beef cattle are not milked regularly), Lucy said this method has limited applicability in beef cattle.

4. A more reliable test, he explained, is for the presence of pregnancy-associated glycoproteins (PAGs) in the blood. This test can detect pregnancy after 25 days. PAGs are only produced in the placenta, so there are fewer chances for false positives. These tests are available commercially, he noted.

The original PAG test is available under the trade name BioPRYN® through BioTracking LLC. Blood samples should be collected approximately 30 days after insemination and shipped to the lab at room temperature for analysis. Results are given to the producer by

telephone, mail, fax or email. The company reports a 99.9% accurate negative predictive value. The positive predictive value is a little lower (about 95%) because some cows that slip an embryo may have PAGs in the blood.

Lucy was optimistic that PAG tests could assist beef producers in detecting pregnancies sooner, though he said that transrectal ultrasounds could be done about the same time as PAG tests and offer the benefit of detecting dead embryos and nonviable pregnancies. However, with the added certainty of ultrasound comes the added cost of ultrasound equipment and technical skill needed.

These tests offer producers options, but Lucy warned that trying to detect pregnancy too early could backfire with more opens than expected due to embryonic loss later. He recommended deciding on a testing



PHOTOS BY TROY SMITH

► While pregnancy tests offer options, MU's Matt Lucy warned that trying to detect pregnancy too early could backfire with more opens than expected due to later embryonic loss.

method that coincides with the goals of the reproductive program for each individual operation.

Lucy spoke during Tuesday's ARSBC session focused on vaccination and pregnancy determination. Visit www.appliedreprostrategies.com/2012/SiouxFalls/newsroom.html to listen to his presentation and to view the accompanying PowerPoint and proceedings paper.



How to Maximize a Vaccination Program

Management strategies underpin success of vaccination program.

by Kasey Miller, associate editor



► Animals must be in a positive energy balance to foster any immune response, said SDSU's Chris Chase.

Many things affect immune response, and immune response is integral to vaccine success, said Chris Chase, professor of veterinary and biomedical sciences at South Dakota State University (SDSU). He explained that no one vaccine program will work for all operations, but there are some management practices that can increase immunity. Chase spoke to attendees of the Applied Reproductive Strategies in Beef Cattle (ARSBC) symposium in Sioux Falls, S.D.

Stress greatly reduces immune response,

Minimize Reproductive Diseases

Management decisions can minimize reproductive diseases.

by Kasey Miller, associate editor

Reproductive diseases affect cattle at all stages of reproduction, from preconception to postcalving, and can cause significant losses, Russ Daly, Extension veterinarian at South Dakota State University told attendees of the Applied Reproductive Strategies in Beef Cattle (ARSBC) symposium in Sioux Falls, S.D.



► The biggest risk factor to an operation's biosecurity is incoming animals, said SDSU's Russ Daly.

Due to the severity of these diseases, it is imperative to keep the problems out of the herd with a biosecurity plan. The factors of disease — host, environment, agent and management — all interact with each other, so producers should know that solutions should consider all factors (see Fig. 1).

The biggest risk factor to an operation's biosecurity is incoming animals. Daly said that visitors, equipment, etc., are also considerations, but they pale in comparison to the risk associated with incoming animals.

In developing a biosecurity plan, Daly recommended four steps:

► **Do your homework on the source of animals.** Find out what testing and vaccination programs are used at the source and the herd's performance. Daly suggested veterinarian-to-veterinarian consultation.

► **Isolate or quarantine new animals.** Daly recommended isolating new animals for 30-60 days to allow for organism shedding, which increases with stress; or at least for as long as practically possible. New animals should have no nose-to-nose contact with existing animals in the herd until after isolation. This time period also allows for diagnostic testing or vaccination/acclimation. However,

so it is best to avoid vaccinating at times of stress, Chase noted. This is true for both calves and older animals.

He recommended waiting two weeks after new calves arrive at the operation before vaccinating them. This is counter-intuitive, because you are already handling them on arrival, but Chase explained that their immune system is suppressed because of the gigantic stressors of transport, commingling and, often, weaning. An underestimated stressor, he pointed out, is dust, especially in drought years. He said weaning should be done before shipping calves.

Animals don't lie about their immune responses, he said. Cattle should show some side effects to vaccines. The side effects show the vaccine has gotten the immune system's attention.

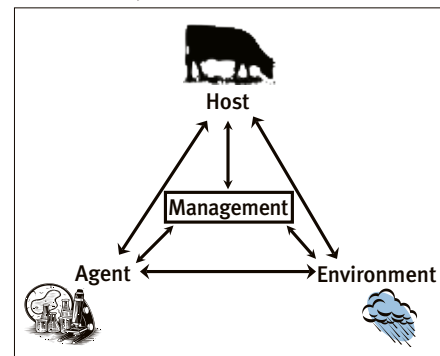
The immune system needs energy, he explained. Without energy, the immune system cells slow down and cannot attack intruding cells. Animals must be in a positive energy balance to foster any immune response.

Chase said older animals also need to be in good body condition, and vaccinating pregnant animals gives added antibodies to colostrum, which, in turn, gives calves better response to vaccines in their lifetime. Postpartum vaccinations should occur prior to rebreeding. In order of importance, energy, protein, vitamin A, vitamin E, copper, zinc, selenium and iron aid in immune response.

Chase recommended nasal vaccination, explaining that mucosal responses are effective in all tracts of the body. "Almost all bovine pathogens enter via airways and mucosa surface," he said.

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Fig. 1: The epidemiologic triad



he warned, no amount of time will protect against cattle persistently infected with bovine viral diarrhea (PI-BVD), so testing is great insurance against contamination.

► **Vaccination.** Daly reminds that vaccination does not necessarily equate to immunity as individual response to vaccines vary. The goal, he said, of vaccination is not to render an individual immune to disease, but to stimulate sufficient immunity within a herd to prevent an epidemic, or widespread outbreak.

► **Environmental control.** The environment affects the ease with which a disease can be transmitted as well as the resistance animals have to the disease agent.

Other management considerations he mentioned included the group composition (number of new animals and number of new sources), segregation from higher-risk groups (keeping new animals away from breeding females) and group size.

The most prevalent reproductive diseases, such as BVD, trichomoniasis (trich), infectious bovine rhinotracheitis (IBR), leptospirosis, vibriosis and neospora, are some of the most devastating reproductive diseases, so it is integral to develop a biosecurity program and working relationship with your veterinarian to combat these diseases. Work with your veterinarian to develop a testing, preventative treatment and vaccination protocol that works for your operation, he urged.

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