Recipe for Success

Conference looks at ingredients for profitably using advancements in technology to enhance reproductive success in the cow herd and garner premiums for a high-quality end point.

by **SHAUNA ROSE HERMEL, WES ISHMAEL, TROY SMITH & STEVE SUTHER**

More than 400 cattlemen gathered in Joplin, Mo., Aug. 31-Sept. 1 for the Applied Reproductive Strategies in Beef Cattle (ARSBC) symposium hosted by University of Missouri (MU) Extension, Joplin Regional Stockyards and the Beef Reproductive Task Force.

The first day of the program focused on "The Missouri Recipe" for reaching the high-quality target and the economic implications — for individual producers and for the industry — of seeking that goal. That recipe included using heat synchronization and artificial insemination (AI) to mate high-accuracy proven bulls to top-quality cows, improving the bottom line through premiums for high-quality beef.

Joplin Regional Stockyard's Jackie Moore and Mark Harmon hosted an evening event featuring a *Certified Angus Beef*® (CAB®) brand steak dinner and management-oriented program, featuring proper management of CIDR® devices, semen handling, trichomoniasis, ultrasound for preg-checking and fetal-sexing, and the Show-Me-Select Replacement Heifer Program.

During the second day of the symposium, speakers focused on nutritional influences on reproduction, bull management and bull-related factors affecting fertility. The closing session offered a diversity of subjects featuring current topics in reproductive management.

Following are outtakes of just three of the nearly 30 speaker presentations. Additional summaries are published in the *Angus Journal* and the *Angus Beef Bulletin EXTRA*. Comprehensive coverage of the symposium is available online at *www.appliedreprostrategies.com/2011/Joplin/*. Compiled by Angus Productions Inc. (API), the site is made possible through sponsorship by the Beef Reproductive Task Force, SEK Genetics, and liveauctions.tv. Coverage includes summaries of the speaker presentations, PowerPoints, proceedings and audio.

Factors Affecting Fertility

Getting females pregnant is the goal of any cow-calf producer's breeding program. But reproductive failures do occur. Factors affecting fertility and, ultimately, pregnancy rates were discussed by South Dakota State University (SDSU) animal scientist George Perry.

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Describing the "Equation of Reproduction," Perry cited four main factors affecting fertility, whether breeding is accomplished through AI or natural service.

1) Percentage of females detected and inseminated. With natural service, detection of standing estrus, or heat detection, is considered 'the bull's job,' but Perry advised managers to spend some time determining whether a bull is getting the job done. Differences in bull libido, or the desire to mate, can't be determined by a breeding soundness evaluation. Libido can be practically evaluated, said Perry, by observing bull behavior after introduction to the cow herd.

When implementing synchronized AI, success often hinges on accurate heat detection. To maximize visual detection of standing heat, Perry advised observation as early and as late in the day as possible, as well as mid-day. Additional observation at midnight is better still. According to Perry, studies suggest nearly 56% of cows initiate estrus between 6 p.m. and 6 a.m. Heat detection aids such as stick-on patches indicating mounting activity can assist with this time-consuming chore. However, Perry advised visual observation, as well, to help determine the most appropriate time for insemination.

2) Inseminator efficiency. According to Perry, natural-service inseminator efficiency is influenced by the bull's physical capability to breed a cow. Assessing this capability is the purpose of the physical examination part of a breeding soundness evaluation.

With AI, inseminator efficiency is influenced by the technician's ability to handle semen correctly and the ability to deposit semen in the correct location. Perry advised careful attention to proper storage, thawing and insemination technique.

3) Fertility level of the herd. Perry said the fertility level of the herd may be the hardest area to evaluate. It includes cycling status, compliance with synchronization protocols, nutrition, disease challenges and embryonic mortality. Perry focused his comments on management factors influencing embryonic mortality.

"Fertilization rates following natural service or artificial insemination range from 89% to 100%. There's little difference," Perry said. "Low pregnancy rates are generally due to embryonic mortality."

Embryonic mortality can result from various stress factors, including a change of diet, Perry explained. He noted how drylot-developed heifers turned out to grass after AI may experience a period of weight loss that results in low pregnancy rates. Perry said heat stress also may increase embryonic mortality, as may vaccinating naive females (not previously vaccinated) with a modified-live virus (MLV) product near the time of insemination.

He recommended vaccinating replacement heifer candidates before and at weaning, with both heifers and cows receiving a booster at least 30 days prior to breeding.

"I'm often asked when is the best time to ship AI-bred cows," Perry stated, noting how shipping stress also may increase embryonic mortality. "Shipping between days 1 and 4 is best, while the embryo is still in the oviduct. Or, ship after Day 45 when the embryo is well-established and fully attached with the placenta."

4) Fertility level of semen. Whether AI or natural service is used, two of the most important indicators of male fertility are sperm motility and morphology. Perry recommended all natural-service bulls receive a breeding soundness evaluation approximately 60 days prior to breeding season.

Perry warned that doing "pretty good" in each of the above areas can still result in single-service success rates below that expected. For instance, if 90% of the cows are successfully detected in estrus, if the inseminator has a 95% success rate, if the fertility level of the herd is 90%, and if semen fertility is 95%, the single-service conception rate would be 74% (90% × 95% × 90% × 95% = 74%).

Perry spoke during Wednesday's ARSBC session focused on management considerations influencing success in estrous synchronization and AI programs. Visit the Newsroom at *www.appliedreprostrategies.com/2011/Joplin/* to view the PowerPoint slides and the proceedings paper submitted by Perry to accompany his presentation. Audio of the presentation will be available.

— by Troy Smith

Energy & Protein Influences on Reproduction

Reproductive failure among cows and heifers, either because females aren't cycling or because of embryonic mortality, is often related to their nutritional status. University of Idaho Extension Beef Specialist and researcher John Hall said the relationship between nutrition and reproduction is likely an adaptive mechanism, which prevents reproduction during times of limited nutrient availability. During such times, maintenance of the cow's or heifer's own body takes precedence.

Hall reviewed the roles of energy and protein nutrition as related to reproduction. He called energy the nutrient of first concern, noting its role in regulating release of hormones. In addition to overall energy availability, the timing of energy increase or deprivation is important in determining pregnancy rates.

"Energy reserves act as a buffer. That's why body condition at calving time is important," said Hall, reminding producers that cows and heifers should exhibit body condition scores (BCS) of 5 to 6, and 6 to 7, respectively.

With regard to replacement heifer development, Hall noted the long-standing recommendation that heifers be grown to 65% of mature weight by breeding time. Reasons include nutrition's influence on age of puberty as well as the goal of building energy reserves. Hall said increased feed costs have caused researchers as well as producers to question the traditional target. Studies have shown that developing heifers to 50%-55% of mature weight can reduce development costs without affecting pregnancy rates.

However, evidence suggests the

percentage of heifers cycling at the beginning of the breeding season and artificial insemination (AI) pregnancy rates may be reduced. In order for a program targeting lower breeding weights to work satisfactorily, Hall recommended that producers have an effective market for open heifers, provide sufficient postbreeding nutrition to keep heifers growing and incorporate a progestin-based estrous synchronization program to induce puberty in a maximum number of heifers.

"Producers need to know their cattle. If heifers typically are slow to start cycling, they won't want to stray far from the 65% target," Hall warned.

Since first-calf heifers still undergo considerable growth while raising a calf, Hall advised careful attention to nutrition, to assure optimum breedback. The reproductive performance of thin cows may also be improved when they are provided supplemental energy. Hall did warn that while fat is a source of energy, exceeding dietary levels of 5%-8% fat can impair rumen function.

According to Hall, protein deficiency may also delay return to estrus, but protein supplementation of pregnant or early-lactating cows grazing protein-deficient forages can decrease the postpartum interval and increase pregnancy rates. Rather than the commonly used crude protein

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measurement, he recommended balancing diets for metabolizable protein, which is an estimate of protein that reaches and is absorbed by the small intestine. Hall also warned that excessive levels of dietary protein may be detrimental to pregnancy rates, but is most problematic when diets are also energy-deficient.

"The connections and signals between nutrition and reproduction are extremely complicated," Hall stated, adding that nutritional management should focus on maintaining cattle in proper nutritional status or achieving that status by critical reproductive events. "The easy-to-use guides are to manage for proper body condition score at calving and maintain that through breeding."

Hall spoke during Thursday's ARSBC session discussing nutritional influences on reproduction. Visit the Newsroom at *www.appliedreprostrategies.com* to view the PowerPoint slides and proceedings paper submitted by Hall to accompany his presentation. Audio of the presentation will be available soon.

— by Troy Smith

Managing Reproduction on Toxic Fescue

There are no silver bullets when it comes to managing the challenges associated with cattle grazing endophyte-infected tall fescue. Challenges include reduced feed intake and performance, reduced fertility rates, increased respiration and body temperature and necrosis of the extremities due to constricted blood flow.

But there are ways to manage the challenges and reap the advantages provided by the widely used forage. That's what Neal Schrick, an animal science professor at the University of Tennessee (UT) told attendees of the ARSBC symposium in Joplin.

For instance, recent UT research suggests that breeding cows (spring-calving) in a narrower window of time can help mitigate the negative reproductive impacts. Though not conclusive, the research is helping explain why.

On the cow side, Schrick explained, the research indicates fescue toxicosis affects either the growing oocyte (egg) or early embryo while it's still in the oviduct. That's why late-pregnancy losses are no higher for cows grazing infected fescue compared to those on the noninfected variety. In the UT studies, Schrick said, "If cows were pregnant at 35 days, they stayed pregnant."

As for bulls, UT research indicates, "the fertilization ability or potential (ability to cleave) is reduced in semen from bulls grazing endophyte-infected fescue. Reduced cleavage rate is associated with the reduced penetration rate of spermatozoa into the oocyte.

As well, Schrick explained, semen collected from bulls grazing infected pastures have reduced post-thaw motility.

With the effect of fescue toxicosis on both bulls and females, Schrick said one recommendation is to remove cows from the toxic pastures for 30 days prior to breeding season and for 30 days afterward. He understands that may not be practical.

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"More practical would be to have your cows calving early if spring calving and get them exposed to the bull before the hot summer months occur," Schrick said. He added that work at UT indicates June 10-12 is the latest breeding date in that state to avoid the most significant reproductive losses associated with tall fescue. Later into the summer, Schrick explained, cows get bred, but the calving season gets spread out.

"When I look at fescue, I have to think about it and heat stress as one and the same," Schrick said. "That's why fall breeding on tall fescue works better."

As well, Schrick emphasized adding clover to pastures and feeding supplemental grain are proven management techniques that help dilute the effect of fescue toxicosis.

"Remember, clover is your friend," Schrick said, stressing the recommendation that clover represent 25%-30% of the forage in an infected fescue pasture.

For anyone wanting to know how to gauge the proportion of clover in a pasture, Schrick related advice he heard someone give: "Take 10 steps across the pasture. If you step on clover three times, you're at 30%."

There are still plenty of unanswered questions about how fescue toxicosis affects cattle performance and reproduction. For instance, Schrick explained, "A lot of producers plant MaxQ (an endophyte-free fescue variety) for their breeding pastures and then move them to endophyte-infected pastures. Will that be a problem? We don't know."

Visit the Newsroom at *www.appliedreprostrategies.com* to view the PowerPoint slides and proceedings paper submitted by Schrick to accompany his presentation.

— by Wes Ishmael

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