

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®) steak dinner and management-oriented program. Speakers focused on 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.

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.

Animal Scientist Warns Against Leaving Proven Technology On the Shelf

David Patterson laments the slow

adoption by U.S. cow-calf producers of proven technologies for synchronized AI. The MU reproductive physiologist told the ARSBC audience that important, convenient and economical management practices are underutilized. He said methods to synchronize estrus for fixed-time AI (FTAI) should be particularly appealing to more producers.

“We have on-the-shelf technologies, including protocols allowing AI by appointment,” Patterson stated, “but they’re not being used.”

Patterson said many producers recognize that genetic improvement can be hastened by the use of proven sires through AI. They resist, however, due to perceptions of higher costs associated with the time, labor and facilities required to implement the technology. Patterson said they are overlooking the potential economic rewards of well-managed synchronized AI.



► Dave Patterson says the economic incentives are real for using fixed-time AI protocols to high-accuracy bulls to meet the high-quality specifications demanded by today’s consumer.

“Overlooked are the economic benefits to the herd,” Patterson said. “There is a huge opportunity to manage calving patterns.”

Synchronized AI is most frequently applied to replacement heifers, utilizing semen from calving-ease sires, to facilitate an abbreviated calving season. Patterson said synchronization protocols for FTAI offer greater convenience and, with long-term protocols involving CIDRs (controlled internal drug release devices), replacement heifer pregnancy rates are comparable to protocols requiring more time-consuming heat detection.

Patterson said synchronization protocols can also be effective in triggering cycling among anestrous cows. Late-calving cows can be ‘moved forward’ — made to cycle sooner. This results in a tightening of the next calving season. Calves are more closely grouped by age, which can enhance marketing. By using AI sires with high-accuracy expected progeny differences (EPDs), producers can add value to their calves and target markets offering premiums for high quality.

The cost, Patterson added, is competitive with natural service utilizing bulls of average price.

Patterson said the economic incentives are real and have not gone unnoticed by the competition. Unless producers take advantage of the technology, he said he fears the U.S. beef industry stands to lose its grip on global markets seeking high-quality beef. He cited Brazil as an example of a country in which producers recognize the opportunity afforded by AI.

“They’re going to clean our clock,” Patterson stated, “if we don’t make use of the technology.”

Visit the Newsroom at www.appliedreprostrategies.com/2011/Joplin/ to view the PowerPoint slides and the proceedings paper submitted by Patterson to accompany his presentation.

— by Troy Smith

AI System Requires No Heat Detection, Results in More Premiums for Quality

Mike Kasten has tried just about every strategy in 37 years of AI on his cow herd. Observation two or three times a day gave way to MGA, then prostaglandin and pregnant mare serum. Syncro-Mate B, limited suckling, early weaning and more technical estrous synchronization programs.

"None have worked remotely as well as the fixed-time AI breeding protocols we are using today," the Millersville, Mo., rancher told attendees.

Those protocols were developed by Dave Patterson's reproductive physiology team



► Mike Kasten knows there will be temptation to breed cows on observed heat, but he offered four reasons not to: "It's a waste of time, it causes confusion, [it] goes against the commitment to discipline you need for fixed-time AI, and it might cause you to do something you'll regret."

Table 1: Results stemming from multiple generations of high-quality proven genetics

	Highly proven x 2	Highly proven x 1	Positive
No. head	83	38	56
Carcass weight	827	815	797
Average REA	12.4	12.8	12.5
Average marbling score	Moderate 69	Modest 61	Modest 19
Average yield grade	3.3	2.9	3.3
Percent Prime	49%	0%	0%
Percent CAB	47%	79%	59%
Percent low-Choice	4%	21%	37.5%
Percent Select	0%	0%	3.5%
Average sale price/head	\$1,444.07	\$1,319.48	\$1,266.59
Positive value difference:	Highly proven x 2 over highly proven x 1		\$124.59
Positive value difference:	Highly proven x 2 over positive		\$177.48

at MU. On heifers, Kasten uses "Show-Me Synch," which calls for a 14-day CIDR insertion with prostaglandin at removal and breeding 66 hours later with a shot of GnRH. Cows get the 7-day CO-Synch + CIDR plan with prostaglandin at removal and insemination 66 hours later with GnRH. That yields 60%-70% pregnancy, about 5 percentage points better than the heifers get.

These strategies work in the several hundred home cows and those of cooperator herds in the Mike Kasten Beef Alliance.

"That's an extension of our herd," he said. "Producers own their cows, and I provide records management. I pick the bulls and replacement heifers, too."

Other AI protocols were higher-labor and less-effective, but the current ones "get easier the more you do it." Despite four trips through the chute, they require little more than 5 minutes from Kasten and a helper per female bred. "With fall calving, fixed-time AI is a must because there is too little daylight to observe heats," he said. "We no longer detect heat at all."

Kasten knows the temptation will always be there to take action when a high-indexing cow or promising heifer shows early heat, but

he offered four reasons to resist: "It's a waste of time, it causes confusion, [it] goes against the commitment to discipline you need for fixed-time AI, and it might cause you to do something you'll regret."

Elaborating with an example on his cow protocol, he said, "It's not called '7-day' because it sounds good. That timing is required. I've heard, 'Oh, we didn't see those in heat so we didn't breed them.' These protocols can get more than 60% of anestrus cows to conceive. Trust the technology," Kasten advised.

Among the beneficial side effects are a "stimulative effect" on fertility, moving cows forward into their second cycle. "They get four chances to breed in 65 days," he explained. "This has moved pregnancy from first reason to maybe third reason to cull, so we can look at performance and other factors."

"Within the Alliance, fixed-time AI (compared to natural service before those herds joined) has resulted in calves 11 days older with more-uniform, predictable genetics," Kasten said.

Not all cows are a perfect fit for the technology; some rarely settle, but the

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majority that do, continue to do so; 61% of his 2001-born cows are still producing.

FTAI allows Kasten to operate with one clean-up bull per pasture, he said, eliminating guesswork on sire groups. That helps in tracking data, which is another strong point in his system.

He showed a line graph of quality grades advancing toward 80% CAB brand acceptance, including Prime. Some cow families stack five or six generations with above-average breed genetics for marbling. Stacking just three generations gets 100% CAB and Prime in his records.

With the Prime premiums today, that's a \$177.48-per-head advantage over the starting point in the Alliance (see Table 1, page 251).

"Weather, markets, politics, the neighbor's bull — genetics is the one thing you truly control. What a risk management tool," Kasten said.

Visit the Newsroom at www.appliedreprostrategies.com/2011/Joplin/ to view the PowerPoint slides and the proceedings paper submitted by Kasten to accompany his presentation. Audio of the presentation will be available.

— by Steve Suther

Using the Missouri Recipe for Hitting the Quality Target

The beef industry may be changing faster and more volatily than ever, but producers must keep their eyes on the prize: consumer demand. That points to a need for more focus on higher quality, said Larry Corah, vice president of Certified Angus Beef LLC (CAB). His presentation at the ARSBC meeting in Joplin invoked a November 2010 *Angus Journal* article on the topic (see "Missouri Shows U.S.," November 2010 *Angus Journal*, beginning on page 133).

Corah reviewed data that shows just a 29% chance of a positive eating experience with USDA Select-grade beef, compared to 82% or higher for premium Choice and 99% for Prime. Moreover, he noted that consumer demand for the CAB brand grew during the recent recession.

Using research data, he discredited "four myths" about aiming for high-quality targets:

Myth 1: There is no extra money to be made.

Myth 2: You have to sacrifice growth and pounds.

Myth 3: High-quality cattle don't feed as well.

Myth 4: That product focus will ruin cow herd functionality.

Those ideas laid aside, Corah noted the industry has largely realized the truth and made great progress in marbling since 2006.

"Much of that is due to genetics," he said, noting that last year's 23% CAB acceptance will be surpassed by this year's estimated 24.1% mark. And MU's Thompson Farm herd is nearing 90% CAB acceptance. "Our surveys indicate 45% to 50% of U.S. beef cows are straight-Angus today; 65% of the fed cattle are black-hided, and that will probably go to 75%."

Beyond breed type, Corah said the key to hitting the highest grade and receiving Prime premiums is AI to high-accuracy registered Angus bulls, then stacking cow families with marbling ability.

Such potentially valuable genetics must be safeguarded with proactive, whole-herd health and nutrition programs, he added. Those must take in every season of the year and every aspect of management on both cows and calves. He shared best practice recommendations in detail.

"Finally, it does not help you as a producer if you take all these steps to add value but then market the calves as a commodity," Corah said, again pointing to specific options from full or partial retained ownership in a feedlot with grid marketing,



► The industry has made great progress in marbling since 2006, said Larry Corah. "Much of that is due to genetics."

to direct sales with data negotiated or special feeder-calf sales with buyer follow-up.

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— by Steve Suther

'Little Things' Count with AI and Synchronization Protocols

"Many people have the idea that the good things they do in management will compensate for the mistakes they make, but the mistakes you make end up canceling out the good things you do." That's what MU animal scientist Mike Smith told folks at the ARSBC conference in Joplin.

Estrous synchronization — through timed breeding or based on heat detection — and AI underscore how much details matter.

Speaking of the timed protocols referred to as fixed-time AI, Smith explained that success revolves around optimizing lots of details — "the number of healthy, cycling females at the beginning of the breeding season; careful attention to sire selection; implementation of an appropriate estrous synchronization protocol; low-stress cattle handling; purchase of high-quality semen; proper semen handling and insemination

Tips for Successful Estrous Synchronization and AI**

Things to do before fixed-time artificial insemination

- Keep accurate calving, breeding and pregnancy records.
- Animal identification should be clear and easily readable.
- Ensure herd health and disease prevention with a well-designed prebreeding vaccination protocol. Vaccinate females a minimum of 30 days before the breeding season begins.
- Decide which estrous synchronization protocol best fits your breeding program, facilities and personnel (see protocol sheets in AI catalogs).
- Ensure all products are purchased and on hand prior to initiation of the protocol.
- Prepare the calendar of actions to ensure protocol compliance.



► Breeding by appointment using a fixed-time AI protocol means cows are bred at a specific time based on the protocol rather than visual observation of heat. Success hinges on program compliance — using “the right product at the right time on the right day.”

technique; and good nutritional management before and after FTAI.”

Get those things right, though, and a high percentage of females conceive early in the breeding season (in the first 21 days), which offers enormous potential. For steers, based on research at the University of Nebraska

(NU), Smith said it means increased weaning weight, increased hot carcass weight, increased marbling score, an increase in the number of carcasses grading Choice or higher and increased carcass value.

For heifer progeny, Smith explained, getting heifers and cows bred in the first 21 days yields increased weaning weight, increased prebreeding weight, increased precalving rate, an increase in the percentage of females cycling before breeding and ultimately higher pregnancy rates.

“So, there are huge performance and reproduction benefits, in addition to genetic improvement,” Smith said.

That’s why more producers are using synchronization and AI, especially via FTAI. This “appointment breeding” means cows are bred at a specific time relative to the synchronization protocol, rather than breeding based on the variable, time-intense method of detecting cows in heat.

Smith emphasized success requires commitment to the details. For instance, cows must be bred according to the synchronization protocol. With FTAI, for instance, Smith said, “You need to breed at the scheduled time; you’re scheduling ovulation.” So, breeding within an hour or two of the scheduled time is vastly different than breeding at the scheduled time.

“Protocol compliance is extremely important,” Smith said. “You must use the right product at the right time on the right day.”

Other details may not seem so obvious. For example, Smith explained the target weight for heifers at breeding is 65% of their mature weight. That means knowing rather than guessing what your mature cows actually weigh.

Incidentally, Smith said utilizing a synchronization program appropriate for natural-service breeding offers a positive first step for producers considering FTAI.

For specific information about how estrus synchronization protocols synchronize estrus and ovulation, check out the online MU course “Fundamentals of Beef Reproduction and Management: Focus on Estrus Synchronization,” available online at http://animalsciences.missouri.edu/extension/beef/estrus_synch/.

Bottom line, Smith explained, “a successful estrus synchronization and AI program is dependent upon being proactive, well-organized, and attention to detail. The success of these systems hinges on many factors” (see “Tips for Successful Estrus Synchronization and AI”).

Visit the Newsroom at www.appliedreprostrategies.com/2011/Joplin/ to view the PowerPoint slides and the proceedings paper submitted by Smith to accompany his presentation. Audio of the presentation will be available.

— by Wes Ishmael

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Sire selection

- Determine if you will purchase or raise replacement heifers.
- Decide how you will market your calves.
- Select proven AI sires with high-accuracy expected progeny differences (EPDs) that match performance goals.
- Purchase semen from a Certified Semen Services (CSS) collection facility.
- Prepare or update your semen inventory.
- Make sure females meet the criteria for being good candidates for estrus synchronization.

Heifer criteria

- Heifers should weigh 65% of their mature body weight by the start of breeding.
- At least 50% of heifers should have a reproductive tract score (RTS) \geq 4 by two weeks prior to the start of synchronization or six to eight weeks prior to the breeding season.

Cow criteria

- Synchronize and inseminate only cows with BCS at calving of \geq 5 (1 = emaciated; 9.0 = obese).
- The average days postpartum of the group of cows to be synchronized should be \geq 40 days by the start of estrus synchronization and experience a minimum of dystocia.

Things to do at the time of synchronization and AI

- Meticulously follow the estrus synchronization protocol!
- If detecting estrus, spend as much time observing the animals as possible.
- Use a minimum of one person to detect estrus per 100 head of cattle.
- Use estrus detection aids to facilitate visual observation of estrus.
- Use a properly trained technician for AI.

Things to do after fixed-time AI

- To distinguish between AI and bull-bred pregnancies at pregnancy diagnosis, wait approximately 10 days to turn in clean-up bulls after AI.
- Pregnancy-check by 75 days after AI via ultrasound or 80-90 days after AI via rectal palpation to distinguish AI from bull-bred pregnancies.
- If cattle need to be shipped, do so between days 1 and 4 after AI, and avoid shipping cattle between days 5 and 42 after AI.
- Maintain breeding females on an adequate nutrition and mineral program.

Source: Taken from the proceedings of the Applied Reproductive Strategies in Beef Cattle conference in Joplin, Mo. Proceedings available for \$25 by contacting the University of Missouri Conference Office at 573-882-4349 or muconf6@missouri.edu.

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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.

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



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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.

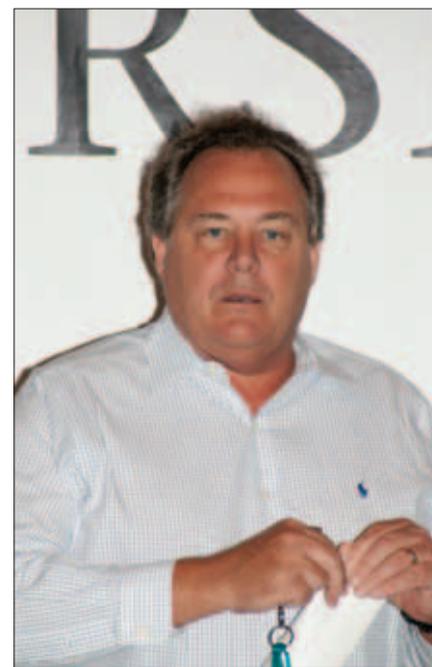
Perry warned that doing "pretty good" in each of the above areas can still result in single-service success rates below that expected. For instance, if 90% of the cows are successfully detected in estrus, if the inseminator has a 95% success rate, if the fertility level of the herd is 90%, and if semen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

Perry spoke during Wednesday's ARSBC session focused on management considerations influencing success in estrus 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

Genomic Evolution

Differences drive genetic selection. Turns out, it's also differences that are enabling the



► Taylor explained that the use of SNPs for predicting breeding value — and the technology allowing fast and accurate assays of them — are leading producers out of what he terms the trough of disillusionment.

industry to harness the power of genomics before knowing what all of the genes are or what they do.

“There are at least 22,000 genes in the bovine genome, and we don’t know what most of them do,” explained Jerry Taylor at the ARSBC conference in Joplin. Taylor is professor and Wurdack Chair in Animal Genomics at MU.

For instance, contrary to popular dogma just a few years ago, Taylor explained, “There are hundreds and thousands of marbling genes, not just one or two.” The same goes for other traits.

“What we do know is that they’re full of

differences,” Taylor said. “Every genome is different than every other genome.” Think of the genome being all of the different genes and gene combinations that comprise an individual.

One way to identify the differences between genomes is by identifying what are known as single nucleotide polymorphisms (SNPs). These differences can be used within a breed population to estimate the breeding value of animals.

Think of it this way: If you try to guess the exact weight of each steer in a pen, you’ll likely be wrong most of the time. Estimate the average weight of steers in

the pen and you’ll likely be closer to being correct.

Likewise, in broad unscientific terms, averaging across SNPs, predicting the genetic merit for a specific trait, is more accurate than depending on a couple of genes known to be associated with the trait.

These genomic differences identified with SNPs are used today to estimate what is termed the molecular breeding value (MBV) for various traits in an individual animal within a breed population. The MBV added to current EPDs increases their accuracy. Young animals with no progeny can have

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EPD accuracies similar to if they'd had already produced progeny.

This is powerful stuff, though a far cry from the original notion that by this time in history every cattle gene and gene interaction would be known. Ultimately, that may be the case. In the meantime, though, Taylor explained that the use of SNPs for predicting breeding value — and the technology allowing fast and accurate assays of them — are leading producers out of what he terms the trough of disillusionment.

All new technologies tend to follow the course of something known as Gartner's Hype Cycle, Taylor said. Introduction of new technology is followed by a rapid rise of inflated expectations, followed by a rapid decline into the trough of disillusionment as it becomes obvious that achieving the promise will take longer and be more complicated than initially thought. That's followed by the slope of enlightenment during which new opportunities are found on the way to fulfilling the promise. That's the point where Taylor said cattle genomics is today.

There's more current opportunity, too.

"The only thing stopping us from having MBVs for production, carcass, feed efficiency and heifer pregnancy rate right now is the cost of the assay," Taylor said. "The technology exists today, but I don't think we can sell it to you for the right price."

For more information, visit the Newsroom at www.appliedreprostrategies.com/2011/Joplin/ to view the PowerPoint slides submitted by Taylor to accompany his presentation. Audio of the presentation will be available.

— by Wes Ishmael

Improving EPD Accuracy With DNA Tests

The advent of molecular information in the form of DNA tests for genetic traits has created considerable excitement within the beef industry. According to University of California-Davis geneticist Alison Van Eenennaam, it has also created some confusion. Van Eenennaam said there is uncertainty among beef producers about how DNA information should be used in making genetic selection decisions.

While various gene markers associated with certain traits have been identified, Van Eenennaam reminded the ARSBC audience that available DNA tests explain only a



► Alison Van Eenennaam reminded the audience that available DNA tests explain only a portion of the overall genetic variation for a trait.

portion of the overall genetic variation for a trait of interest. A specific trait, such as marbling, may be influenced by thousands of genes for which there are not yet any available tests.

Van Eenennaam warned against using DNA marker test results in place of EPDs and economic index values (such as dollar value indexes, or \$Values) for making selection decisions. The power of this technology, she said, will only be fully exploited when it is integrated into national cattle evaluations that result in calculation of EPDs.

"The ideal situation," Van Eenennaam stated, "is to use this molecular information to improve the accuracy of EPDs."

That has begun, she added, noting how the American Angus Association is adding molecular information to the traditional phenotypic information (pedigree, individual performance and progeny performance data) used to calculate EPDs. The inclusion of DNA information should provide the greatest benefit to young animals with little progeny data. Van Eenennaam said the improvement to accuracy resulting from including DNA information would be similar to adding performance data from seven to 20 progeny, depending on the trait.

As DNA testing becomes more comprehensive and encompasses a larger

number of traits, it should provide a selection tool for traits where no other information or selection criteria exist. This could include economically relevant traits, including cow and feedlot efficiency, and disease resistance.

Regarding the economic value of DNA testing, Van Eenennaam said it is likely to be of greater value to producers of elite seedstock.

"The value depends on your place in the chain and your opportunity for value capture," Van Eenennaam explained. "For most producers, the cost has to come down to make it pencil, especially in commercial operations."

For more information, visit the Newsroom at www.appliedreprostrategies.com/2011/Joplin/ to view the PowerPoint slides and proceedings paper submitted by Van Eenennaam to accompany her presentation.

— by Troy Smith

Coordinating Sire Genetics in a Synchronized AI Program

Variability is a big challenge in the beef industry. Predictable quality and production levels are affected by individual ranch management and environment, as well as cattle genetics.

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► MU economist Joe Parcell led a team that looked into the production and marketing potential of coordinating sire genetics, as well as age, source and health verification.

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MU economist Joe Parcell led a team that looked into the production and marketing potential of coordinating sire genetics, as well as age, source and health verification. He summarized and commented on the work at the ARSBC in Joplin.

The white paper in the proceedings focuses on a study of 328 Angus-based calves in four sire-class groups, compared through harvest. Therein, the group from high-accuracy sires demonstrated many advantages, including the highest CAB brand acceptance of all, at 67%.

In comments, Parcell was more expansive. "We want to see how this technology can impact your bottom line," he said. "When you synchronize heat and use high-accuracy sires in fixed-time artificial insemination, you take out much of the variability."

Other, prior research showed a 25% variation in mean feeding value of calves from highly proven sires, compared to 89%

variation from low-accuracy sires, he noted.

Parcell said technology can be "bundled" to amplify advantages. Adding detail to cow herd production records can help chart known genetics over several generations, and those records can be enriched with feedlot and carcass data.

Increasing use of FTAI along with these records can "stack sire and cow genetics, and in effect that leads to highly accurate cows," he said. Marketing of calves is best accomplished through some kind of alliance, but the sale barn can be part of that, Parcell added.

Many producers resist using AI because they believe it is too expensive, but the economist took aim at that idea. "If you have more than 50 cows and spend more than \$3,000 for a bull," he said, "you can benefit from using AI."

For more information, visit the Newsroom at www.appliedreprostrategies.com/2011/

Joplin/ to view the PowerPoint slides and proceedings paper submitted by Parcell to accompany his presentation.

— by Steve Suther

A Review of the Use of Ultrasound for Reproductive Purposes in Beef Cattle

For many years, rectal palpation has been a mainstay of veterinarians for pregnancy diagnosis, and that will likely continue. But ultrasound has grown in importance over the past two decades because it can tell more, earlier and with less risk.

Scott Pooch, MU veterinarian and dairy specialist, elaborated on those advantages while taking part in a series of live demonstrations at the Joplin Regional Stockyards Wednesday evening, Aug. 31, as part of the ARSBC meeting.

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Domestic and Global Opportunities for Producers of High-Quality Cattle

The amount of meat U.S. consumers eat is declining. Per capita consumption is decreasing for beef, but also for pork and poultry. There has been considerable research to determine the reasons for weakening demand. According to Scott Brown, assistant professor at MU's Food and Agriculture Policy Research Institute (FAPRI), one of the factors contributing to decreased demand for beef is that many consumers prefer the consistent high-quality beef for which there currently is too little supply.

"When there is such intense competition for the center of the plate, creating a product that consumers prefer amounts to a win for the [beef] industry, hands down," stated Brown. FAPRI research suggests U.S. beef producers should train their focus on producing high-quality beef.

The general economic recession has caused consumers to behave differently when making food choices, Brown shared. Often, they have substituted lower-priced products for higher-priced items, and some consumers have turned from steak to lower-priced alternatives. However, sales of some premium beef products, such as CAB, actually grew. Despite a general trend toward reduced consumption and buy-down of food products, demand for high-quality beef increased.

Exports have bolstered overall demand for U.S. beef, Brown said, calling growth in export value "phenomenal." Current values in excess of \$5,000 per metric ton represent a recovery of up to \$1,000 per metric ton since values plunged in the wake of the 2003 discovery of bovine spongiform encephalopathy (BSE) in the United States.

Brown noted ongoing recovery of beef exports to the important Japanese and South Korean markets, and growing markets in other countries. In many cases, he said, the newer markets exhibit a preference for high-quality beef.

"I see great potential for serving high-quality beef markets around the world," Brown told attendees. "But there are going to be more competitors for those markets, too. The U.S. needs to have supplies available to meet the demand."

Noting the low U.S. cattle inventory and continually declining cow numbers, Brown sees reason to shift into expansion mode and focus on quality. Supporting that strategy, he said, is the very real willingness of U.S. consumers to pay a premium for preferred quality products and the promise of greater global demand for high-quality beef. According to Brown, the economic incentive to produce more high-quality cattle already exists.

"The Choice-Select (price) spread has narrowed, but premiums for Prime beef have grown. There has been a return of demand for high quality," Brown said. "Increasing the percentage of cattle that grade Prime could have consumer impacts that have eluded the industry for decades."

For more information, visit www.appliedreprostrategies.com/2011/Joplin/ to view the PowerPoint slides and proceedings paper submitted by Brown to accompany his presentation.

— by Troy Smith



► Scott Brown sees reason for cattlemen to shift into expansion mode and focus on quality, a strategy supported by the willingness of U.S. consumers to pay a premium for quality products and the promise of greater global demand for high-quality beef.

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Noting the calibrated instrument screen, Pock provided a play-by-play account.

"Here's the head of the calf. You can see it is about 4 cm long, so that is 75 to 80 days. Here's the umbilical cord, the spine, ribs, the beating heart. That's important because you want to know it's alive," he said.

At that age the calf is "the size of a small rat," but beyond the umbilical cord the presence of a scrotum indicated a male. Females can be discerned a bit sooner, as early as 55 days, Pock said.

"A great time to process a herd for diagnosis is 90 days after FTAI, he noted. "I can sex the AI calves and the first cleanup round, plus determine pregnancy on the third round."

Confessing, "I'm not 100% accurate," Pock noted the most experienced technicians are 92% up to 100%. Some of the variation could also relate to facility and time spent with each.

"I have done 30 in an hour, and nearly 90 in an hour," he said, depending on how fast they are presented and days bred, as well.

A reference table from research veterinarians Colloton and Stroud published in the symposium proceedings lists the sizes of observed structures in the calf fetus with correlating days pregnant.

— by Steve Suther



► Tammy Wallace demonstrated the procedure for inserting a CIDR while Stan Lock described the procedure at an ARSBC evening session hosted at the Joplin Regional Stockyards.

Using CIDRs: Pay Attention to Detail

Sanitation is imperative when using CIDRs in an estrous synchronization program, Harold Miller, Accelerated Genetics and Stan Lock, Genex Cooperatives, stressed as they gave a

demonstration of proper CIDR insertion at the Joplin Regional Stockyards.

Miller and Lock explained CIDR insertion and removal protocols as Tammy Wallace demonstrated the procedure on live cows.

Miller encouraged the standing-room-only audience to pay attention to all the details that could affect reproductive rates. Something as obscure as dust blowing could be a source of infection.

"How we follow the details can affect that formula for reproductive success that George Perry talked about this morning," Miller emphasized. Perry had described four factors affecting single-service conception rates — estrous detection success, inseminator efficiency, fertility level of the herd and fertility level of the semen (see page 254). A 90% success rate in two of those areas along with a 95% success rate in the other two would provide an overall single-service conception rate of 74%, he reminded.

Referring to page 223 of the meeting's proceedings, Miller turned the program over to Lock who walked the audience through the steps of inserting a CIDR:

- Wear latex gloves to avoid contact with the CIDR, which contains progesterone.
- It's critical to maintain sanitation. Lock recommended a two-bucket wash with Nolvasan or Chlorohexidine in both



► Scott Pock demonstrated how to use ultrasound for pregnancy checking and fetal sexing.

buckets and updating the disinfecting solution often.

- ▶ Insert the CIDR into a gun made for CIDR insertions. Lock showed two sizes, a longer blue gun for use in cows and a shorter green gun for use in heifers.
- ▶ Fold the wings of the CIDR and insert it into the applicator. It will protrude about 1 inch from the applicator.
- ▶ Lock says he uses a CIDR lube product to help lubricate and disinfect.
- ▶ Pull the cow's tail to the side, and clean the vulva with a paper towel.
- ▶ Open the lips of the vulva and gently insert in an upward manner until the CIDR gently bumps the cervix.
- ▶ Rotate to position CIDR with tail down, deposit the CIDR by depressing the plunger, and remove the gun. The blue tail should hang down out of the cow. It can be clipped so that only 2.5 inches protrudes from the vulva to prevent other animals from removing the CIDR.
- ▶ Begin the disinfection process and start over.

To remove, Lock said, locate the blue tail, pull out and throw the used CIDR away. This process can easily be done in an alley if all the tails are showing.

If you don't see the blue tail, it could mean the cow lost the CIDR, which is not very likely, or the tail may not be visible externally. Check the cow to be sure the CIDR is not still inside her.

With good facilities, Lock said CIDRs can be inserted into 60-80 cows within an hour. If attention is paid to detail and sanitation, he says he sees very few instances of loss or infection.

— by Shauna Rose Hermel

Semen Storage and Handling

As part of the management-focused evening at the Joplin Regional Stockyards, AI professionals demonstrated proper techniques for storing and handling semen. Leading off, ABS Global representative Brian Brace reviewed packaging systems for frozen semen, as well as the care and use of equipment such as semen storage tanks employing liquid nitrogen, thawing units, and equipment used during insemination.

Brace said the predominant form for semen packaging and delivery is the semen straw, which allows for relatively uniform control of freezing and thawing processes.



▶ "It is important to understand that semen should be thawed according to the recommendations of the company supplying the semen," Brian Brace explained while giving an overview of AI equipment.

While the 0.5-mL (½ cc) straw is most popular, Brace said some semen providers package semen in 0.25-mL (¼ cc) straws.

"Each has a different surface-to-volume ratio, which requires different handling procedures, and recommendations can vary among semen providers," Brace explained. "It is important to understand that semen should be thawed according to the recommendations of the company supplying the semen."

Tips for handling storage tanks included keeping tanks away from direct sunlight, in a cool, dry and well-ventilated environment. Producers were warned against allowing tanks to rest directly on concrete floors, as acids in concrete may corrode the bottoms of tanks. Placing tanks on wooden pallets was recommended, as was frequent monitoring of nitrogen levels and recharging of each tank before the nitrogen level falls below 2 inches.

KABA/Select Sires representative Dan Bush demonstrated procedures for removing frozen straws from tanks, use of thaw bath units and preparation of sheaths and insemination guns. He recommended never thawing more semen than will be used within 10 minutes.

"I might be overcautious about semen handling, but better control of temperature means better results," Bush stated. "Be particularly efficient and quick with ¼ cc

straws. They are more susceptible to temperature change and warm quicker."

— by Troy Smith

Trichomoniasis Challenge is Growing

"Trichomoniasis can be economically devastating enough that some producers who have gone through it are no longer producers," said Craig Payne, veterinarian and director of medical extension and continuing education at MU. That's because of the open cows and the extended calving seasons resulting from trichomoniasis (trich) infection.

Payne explained that the number of open cows averages 40%-50% in naive herds exposed to trichomoniasis.

Incidentally, he explained, subsequent infections in a herd affect fewer cows because some will build immunity to the disease that can last up to 15 months.

There's nothing new about trich, but it continues to grow beyond the western boundaries typically associated with it. For instance, Payne said, "Up until the last few years, the disease was almost nonexistent in Missouri, but now it's being diagnosed with greater frequency throughout the state."

More states — Missouri most recently — are developing or revising trich regulations,

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including requirements for bulls to be tested prior to selling.

Trichomoniasis is a venereal disease caused by a protozoan parasite spread primarily by infected bulls to cows. There are no physical signs of the infection in bulls; their libido and fertility remain the same, Payne said.

He noted that bulls can be infected chronically or transiently. Though there are exceptions, bulls 3 years old and older are usually chronically infected, while younger bulls are more likely to have a transient infection.

Likewise, Payne said, there are few tell-tale signs in cows and heifers. Sometimes infected females may exhibit a mild vaginal discharge. Though the infection leads to inflammation, it doesn't interfere with conception. Instead, embryonic death occurs, usually within 50 to 70 days of gestation.

Less than 15% of the time, Payne noted, there can be late-gestation abortions. Though more rare, some infected cows can also develop pyometra (a heavy, pus-filled uterus).

"Cows and heifers typically return to estrus one to three months after breeding, but a period of infertility may last for two to six months as a result of the infection," Payne said. "Occasionally, cows may become permanently infected, yet be able to deliver

a normal calf. This condition is rare, but of concern because these animals can serve as a source of infection to bulls in the following breeding season."

Producers often discover trichomoniasis only after a calving season is squandered. Salt in the wound comes with the fact that there is no treatment for infection in bulls or cows.

If trichomoniasis is diagnosed in the herd, Payne explained, infected bulls will need to be removed, open cows should be culled, and only tested trich-free bulls or virgin bulls should be used as replacements.

"If trich is suspected, your veterinarian is the most qualified person to collect samples and make the diagnosis," he advised.

— by Wes Ishmael

Capturing Added Value

Adding value to cattle makes little difference if you can't capture it. That's why Joplin Regional Stockyards — the second largest livestock market in the United States — is so willing to try new things.

"It has always been my goal to help producers prosper in this business," said Jackie Moore, owner, who started in the auction business when he was 13 years old. Consider a short list of innovations Joplin Regional Stockyards has undertaken in recent years:

- ▶ the addition of weekly video sales to help producers hedge risk;
- ▶ the early adoption of assembling cattle for preconditioned sales;
- ▶ developing a source- and age- verification program for customers; and
- ▶ establishing a monthly magazine to help customers track the market.

Joplin Regional Stockyards sold 459,000 cattle last year for more than \$300 million.

"We have something for every producer," said Mark Harmon, marketing director.

Opportunities for producers include an array of educational programs. As an example, the stockyards hosted a portion of the recent Applied Reproductive Strategies in Beef Cattle (ARSBC) Conference, which included information about fixed-time AI.

"I've been doing timed AI for the past four years. It's been the greatest thing I've ever done," Harmon said. "Jackie taught me the only thing you really have control over is how you spend your time. Take the time you have with your cows and make it more useful." FTAI, he said, is a practice that allows him to do that.



▶ "Jackie taught me the only thing you really have control over is how you spend your time. Take the time you have with your cows and make it more useful," said Mark Harmon, marketing director of Joplin Regional Stockyards.

Along with the savings in time by consolidating his calving season, Harmon added, "I can't afford a bull as good as the one I can pull out of the tank. ... When we bred cows last year, I already knew how I was going to market them."

Though short cattle supplies have lifted cattle prices to record highs, Moore and Harmon emphasized record-level input costs mean marketing deserves the growing attention of producers.

"We've got a good market and a better one coming," Moore said. He noted the current widespread drought means Texas alone will lose as many as a million cows. Between that and an aging national cow herd due to economics, he predicted female value is set to explode as



▶ Craig Payne explained that the number of open cows averages 40%-50% in naive herds exposed to trichomoniasis.



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► “We’ve got a good market and a better one coming,” said Jackie Moore, owner of Joplin Regional Stockyards. Noting the current culling due to drought and an aging national cow herd due to economics, he predicted female value will explode.

producers in drought areas ultimately build back.

“My thinking is that they can take a heifer down there (Texas) to build back,” Moore said. Buying heifers will offer producers in drought areas a cheaper way to restock, plus it matches the timeframe and productivity of recovering pastures and rangeland.

“I think heifers in the right situation, if everyone gets some rain, will be worth what steers are worth and more,” Moore explained. “I know feed’s high, but if you can get \$2,000 for a bred heifer or \$1,000 for a heifer weighing 750 pounds, you can afford to feed more feed.”

“In times like these, there are lots of opportunities. You just have to have the nerve to try,” Moore said. “I think there’s a lot of money to be made on these females for the next year or two.

Moore and Harmon hosted cattlemen at the Stockyards for an evening ARSBC session focused on practical management tips and the Missouri Show-Me-Select Replacement Heifer Program.

— by Wes Ishmael

Missouri Show-Me-Select Replacement Heifer Program

“Beef is big business in Missouri, contributing \$16 billion annually to the state’s economy,” MU animal scientist David Patterson told the crowd at Joplin Regional Stockyards. The Show-Me-Select Replacement Heifer Program has bolstered the beef industry’s role, he added.

Patterson called Show-Me-Select unique in that it is an educational program coupled with a marketing component. He said efforts to help producers apply technologies and management techniques to replacement female development enterprises have “spilled over,” fostering increased application among breeding herds across the state. That, he added, has contributed to enhanced reproductive efficiency and more effective marketing.

“It’s working,” Patterson stated. “We’re seeing expanded use of estrous synchronization and artificial insemination in cow herds, more rapid genetic improvement and enhanced management.”

Patterson, a reproductive specialist who

serves as the program’s coordinator, along with MU regional extension specialists Eldon Cole, Roger Eakins and Al Kennett and veterinarian David Cupps, explained how a pilot project grew into the first statewide, on-farm beef heifer development and marketing program in the United States. They told how Show-Me-Select has sparked “contagious enthusiasm,” attracting producer participants, large and small, from 103 of Missouri’s 114 counties. Since 1997, 706 operations have enrolled nearly 98,000 heifers.

To illustrate the added value of heifers enrolled in the program, the presenters summarized prices received for Show-Me-Select heifers selling in fall 2010 and spring 2011. Serving as a baseline were heifers carrying natural-service pregnancies, which sold for an average price of \$1,439 per head. Heifers carrying AI-sired pregnancies averaged \$1,526, or \$87 over the baseline average.

The presenters explained how “Tier Two” heifers — those sired by sires whose EPDs meet minimum requirements for accuracy — represented additional levels of added value. Tier Two heifers bred by natural service brought \$136 over the baseline average, for an average price of \$1,575. Tier Two heifers carrying AI-sired pregnancies averaged \$1,680, adding \$241 to the baseline average.

Patterson said the sale price differentials have provided financial incentives that are spurring a growing appreciation for reproductive management and genetic improvement.

— by Troy Smith



Eldon Cole



Roger Eakins



Al Kennett



David Cupps

► David Patterson, Show-Me-Select Replacement Heifer Program coordinator, along with MU regional extension specialists Eldon Cole, Roger Eakins and Al Kennett and veterinarian David Cupps, explained how a pilot project grew into the first statewide, on-farm beef heifer development and marketing program in the United States.