Kansas K-STATE Kansas State University
VETERINARY
FOR THE PRACTICING VETERINARIAN Quarterly

Winter 2006
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Welcome new faculty in the College of Veterinary Medicine

Mike Apley

Dr. Apley is a second-generation Kansas State University D.V.M. with a Ph.D. in physiology (pharmacology). He is a Diplomate of the American College of Veterinary Clinical Pharmacology. His practice background includes two years in general practice in central Kansas and four years in a feedlot consulting and contract research practice based in Greeley, Colo.

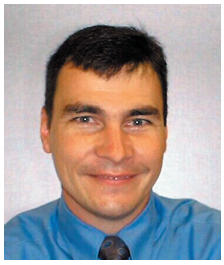
Mike Apley

Apley was on the faculty at Iowa State University from 1996 to 2005 where he was an associate professor in the Department of Veterinary Diagnostic and Production Animal Medicine and served as interim director of the Production Animal Medicine Section in 2004-2005. In August 2005, he moved to the Department of Veterinary Clinical Sciences at Kansas State University.

Apley works with veterinarians throughout the United States concerning the use of drugs in food animals and also in the area of beef cattle health, with an emphasis on feedlots. In addition he teaches beef production medicine, large animal medicine, and pharmacology courses. Research interests include infectious disease, antimicrobial resistance, and applications of drugs in food animals. Apley is a past president of the Academy of Veterinary Consultants, president-elect of the American College of Veterinary Clinical Pharmacology, and director of the Veterinary Antimicrobial Decision Support (VADS) System project.

Hans Coetzee

Dr. Hans Coetzee obtained a Bachelor of Veterinary Science degree from the University of Pretoria (Onderstepoort), South Africa in 1996 and was admitted to membership of the Royal College of Veterinary Surgeons (RCVS). Following graduation, he spent four years in mixed veterinary practice in Northern Ireland where he served as treasurer for the North of Ireland Veterinary Association and was awarded the Northern Ireland Veterinarian of the Year Award in 2000. He earned a certificate in cattle health and production from the RCVS. Later Coetzee joined the research and development department at Norbrook Laboratories Ltd. where he conducted pharmaceutical trials in accordance with Good Laboratory Practice (GLP) principles for submission to both European and American regulatory authorities.



Hans Coetzee

In 2002, Coetzee relocated to the United States where he was appointed as an adjunct instructor and later was hired as a veterinarian at Iowa State University. He obtained a Ph.D. in Veterinary Microbiology from Iowa State University in August 2005. Coetzee's professional interests include dairy production medicine and food animal clinical pharmacology.

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Thank you

The Kansas State Veterinary Diagnostic Laboratory recently conducted a lab-user survey and wishes to extend appreciation to all who took time from busy schedules to provide useful information. We will use the survey results to plan and implement changes during the coming weeks and months. Thank you for your efforts, and we trust that you will soon notice positive effects.

Also in this issue

Thank you to the Pfizer Animal Health Group, Livestock Division, Cattle Products Group, for financial assistance in publishing this newsletter.

Elanco adds to Micotil warning label

Elanco recently received approval from FDA to add a new portion to their black box warning label.

Seems that when Micotil is injected accidently into humans, it acts as a potent calcium channel blocker. So in addition to the current recommendation of putting ice on the injection site while rushing the person for medical attention, the box will also indicate that IV calcium should be part of the treatment.

The Rocky Mountain Poison Control Center (RMPCC) has the information, and Elanco has sent it to all the emergency rooms around cattle country. RMPCC's phone number is 800-222-1222.

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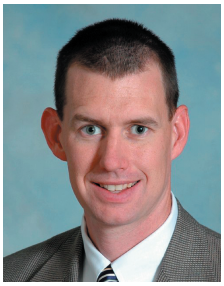
Brad White



Brad White

Brad White is an assistant professor in agricultural practices. He received a D.V.M. from the University of Missouri-Columbia and a master's degree from Mississippi State. After graduation from veterinary school, he worked for six years in a mixed animal practice in southeast Missouri. His focus is beef production medicine and management with an emphasis in marketing programs and use of performance statistics to enhance production and net returns.

Lynn Abel

Lynn Abel

Lynn Abel received a D.V.M. from Kansas State University in 1998. She is an instructor in anatomy and physiology.

Sabrina Brounts

Sabrina Brounts

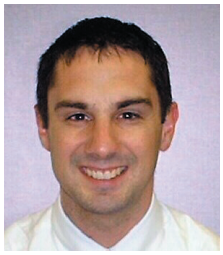
Sabrina Brounts is an assistant professor of equine surgery. She received a D.V.M. in 1999 from the University of Veterinary Medicine in Utrecht, Netherlands and a master's degree from Purdue in 2004. She is a Diplomate in the American College of Veterinary Surgeons.

Kyeong-Ok Chang

Kyeong-Ok Chang

Kyeong-Ok Chang received a D.V.M. in 1989 from the Seoul National University, M.S. from the Seoul National University in 1991, and Ph.D. in 1999 from The Ohio State University. He is an assistant professor in infectious disease.

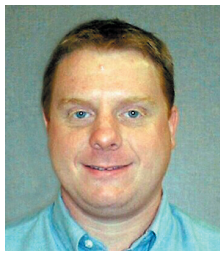
Justin Kastner



Justin Kastner

Justin Kastner is an assistant professor in food safety and security. He received a B.S. from Kansas State University in 1998, MSc from London South Bank University in 2000, PgDip from the University of Edinburgh in 2000, and Ph.D. from the University of Guelph in 2003.

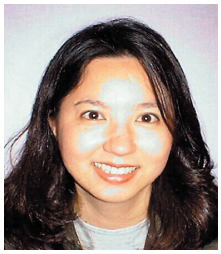
Butch Kukanich



Butch Kukanich

Butch Kukanich, assistant professor of anatomy and physiology, is a Diplomate in the American College of Veterinary Clinical Pharmacology (2004). He received a bachelor's degree in 1994, a D.V.M. in 1997 from Virginia Tech and a Ph.D. from North Carolina State University.

Annelise Nguyen



Annelise Nguyen

Annelise Nguyen received a B.S. (1996) and Ph.D. (2001) from Texas A & M University. She is an assistant professor.

Patricia Payne

Patricia Payne

Patricia Payne is an assistant professor in parasitology. She received a B.S. in 1969, D.V.M. in 1971, and Ph.D. in 2000 from Kansas State University.

David Renter

David Renter

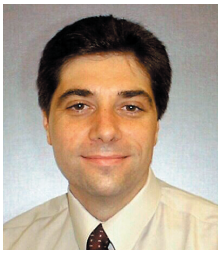
David Renter's area of expertise is epidemiology. He is an assistant professor. He received a B.S. in 1994 from the University of Nebraska at Kearney, and a D.V.M. in 1998, and Ph.D. in 2002 from Kansas State University.

Emily Soiderer

Emily Soiderer

Emily Soiderer is an assistant professor of small animal surgery. She is a Diplomate (2004) in the American College of Veterinary Surgeons. She received a D.V.M. in 1999 from Michigan State University and a B.S. degree in 1995 from John Carroll University.

Zsolt Szladovits



Zsolt Szladovits

Zsolt Szladovits received a D.V.M. in 1998 and Ph.D. in 2005 from Szent Istvan University (Budapest, Hungary). He is an instructor in the Department of Anatomy and Physiology.

Masaaki Tamura

Masaaki Tamura

Masaaki Tamura is an associate professor of anatomy and physiology. He received a D.V.M. in 1973 from Kitasato University (Japan), a M.S. in 1977, and Ph.D. in 1998 from Azabu Veterinary University.

Testing ear notches for BVD virus using ELISA test

Editor's note: Recently the K-State Diagnostic Laboratory began testing for persistent BVD virus infections using the ear-notch ELISA test. We will continue to offer immunohistochemistry for persistent BVD testing. Both tests use the same monoclonal antibody to recognize the virus, so the sensitivity and specificity of both appear to be similar. The advantage of the ELISA is that it requires less labor and offers faster turnaround time. For information on both tests call Cindy Chard-Bergstrom, who performs the tests, or Dr. Gary Anderson at 785-532-5650.

BVD ELISA

Tissue samples must be a minimum of 1 cm x 1 cm. Make sure there is skin on both sides of notch.

Place the sample in a tube that is at least 12mm wide (bigger is okay) and contains 2 mL PBS. Contact us for the correct formula. You can buy pre-filled tubes from us for $0.30 each. Keep tubes at 4° to 7°C. *The ear must be submerged in the PBS. A dried-out ear can yield a false negative result.*

Sample submission

Samples should be kept refrigerated and delivered to the lab within two days of collection. If time from collection to delivery will take longer, samples should be frozen. Accompanying paperwork should include tube numbers and animal IDs matching the sample tubes. A submission form is available on request.Turnaround time is 1 to 2 days, and cost is $2.50 per ear.

BVD IHC

Use an adult-size pig ear notcher to collect sample tissue. A baby pig notcher tends to yield too small a sample. Make sure there is skin on both sides of notch.

Place sample in a 10 mL red-topped tube (nothing smaller, bigger is okay). Fill tube with preferably 10% neutral buffered formalin (regular 10% formalin is okay). Pre-filled tubes may be obtained from us for $0.30 each.

Submit samples as soon as possible. They must arrive with paperwork that includes tube numbers and animal IDs matching the sample tubes. We have a sample submission form available on request.

Turnaround time is 3 to 4 days. Cost-for fewer than 100 samples is $12 for the first sample and $4 for each additional animal. More than 100 costs $12 for the first sample and $3 for each additional animal.

If total number to be sent in is more than 100, smaller lots will receive a discount with prior approval.

Antibiotic uptake by plants from soil fertilized with animal manure

K. Kumara,, S. C. Guptaa, S. K. Baidoob, Y. Chandera and C. J. Rosena*

Antibiotics are commonly added to animal feed as supplements to promote growth of food animals. However, absorption of antibiotics in the animal gut is not complete, and as a result substantial amounts of antibiotics are excreted in urine and feces that end up in manure.

Manure is used worldwide not only as a source of plant nutrients but also as a source of organic matter to improve soil quality especially in organic and sustainable agriculture. Greenhouse studies were conducted to determine whether or not plants grown in manure-applied soil absorb antibiotics present in manure. The test crops were corn (*Zea mays L.*), green onion (*Allium cepa L.*), and cabbage (*Brassica oleracea L. Capitata* group). All three crops absorbed chlortetracycline but not tylosin. The concentrations of chlortetracycline in plant tissues were small (2–17 ng g–1 fresh weight), but these concentrations increased with increasing amount of antibiotics present in the manure.

This study points out the potential human health risks associated with consumption of fresh vegetables grown in soil amended with antibiotic laden manures. The risks may be higher for people who are allergic to antibiotics and there is also the possibility of enhanced antimicrobial resistance as a result of human consumption of these vegetables.

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Domestic animals as reservoirs of methicillin-resistant *Staphylococcus aureus*

Jerome Nietfeld, D.V.M., Ph.D.
K-State Veterinary Diagnostic Laboratory

Recently I received a phone call from a veterinarian requesting information concerning dogs as a possible reservoir for methicillin-resistant *Staphylococcus aureus* (MRSA) in humans. The veterinarian's client had a 17-month-old child who was being treated for the third time for a MRSA skin infection.

The child's physician told the mother that dogs can carry MRSA and requested that the family's dog be tested. The dog was completely healthy and the veterinarian was requesting advice as to what samples to collect. I had to admit I knew nothing concerning the role of pets as reservoirs of human infection by MRSA, but said I would research the subject and call back with my findings. As MRSA becomes increasingly important in human medicine and animals are recognized by physicians as possible reservoirs, requests to test animals for the organism are likely to increase. I hope the following information will be helpful to a few veterinarians.

Staphylococcus aureus is an important pathogen of humans causing skin and wound infections, pneumonia, postsurgical complications, endocarditis, and septicemia.[1,2] It is also a common inhabitant in the nasal cavity of healthy people with 25 to 50 percent of humans colonized, either transiently or chronically. Risk factors for clinical disease in humans include surgery, trauma, concurrent infections, skin lesions, and immunocompromise.[1,2] Shortly after the discovery of penicillin, strains of *S. aureus* that produced an enzyme, _-lactamase, that inactivated penicillin were discovered. Today more than 90 percent of all *S. aureus* isolates from humans are resistant to penicillin. Semisynthetic penicillins, such as methicillin, contain _-lactam rings that are resistant to the action of _-lactamase. Some bacteria have a penicillin-binding protein in their cell wall that has a low affinity for _-lactam antibiotics, they are resistant to all _-lactam antibiotics and are commonly referred to as methicillin-resistant.1 Methicillin-resistant *S. aureus* is much more difficult and costly to treat and is associated with much higher mortality when compared to infection by methicillin-susceptible *S. aureus*. Methicillin-resistant *S. aureus* is an important cause of noscomial infections, which have become increasingly common. Recently, the incidence of community-acquired MRSA infections has increased. Initially most community acquired infections were associated with contact with health care facilities or previous antibacterial therapy, but in the past few years infections in people with no known risk factors have increased.

> *Staphylococcus aureus* is an important pathogen of humans causing skin and wound infections, pneumonia, postsurgical complications, endocarditis, and septicemia.

The prevalence of MRSA in domestic animals is unknown, but recent studies have found that a variety of animals can be colonized, and the prevalence of MRSA in animals may be increasing, as it is in humans. Dogs and horses appear most likely to be infected, but the organism has been isolated from a wide variety of animals, both clinically ill and healthy.

A survey for *S. aureus* infections at seven veterinary teaching hospitals in the United States identified 65 patients (36 canine, 18 equine, 7 bovine, 2 avian, and 2 feline) infected by *S. aureus*.[3] Nine (14%) (four canine, four equine, and one feline) of the 65 were methicillin-resistant; four of the isolates were from the skin, four were from the musculoskeletal system, and one was from the respiratory tract.

Swabs from the oral and nasal mucosa of 45 dogs, 12 cats, and 78 staff members, and from 30 environmental surfaces at a university veterinary teaching hospital in the United Kingdom were cultured for MRSA.[4] Fourteen staff (17.9%), four dogs (9%), and three environmental surfaces (10%) were positive. Pulse field gel electrophoresis revealed that most isolates were indistinguishable (56%) or closely related (26%) to one of two MRSA strains most common in UK human hospitals.

> Methicillin-resistant *S. aureus* is much more difficult and costly to treat and is association with much higher mortality when compared to infection by methicillin-susceptible *S. aureus*.

Another study looked for MRSA in clinical samples from a university veterinary teaching hospital and 16 private veterinary practices in Ireland.[5] Nasal swabs from personnel working at hospitals where MRSA was isolated were obtained and cultured.

Over a period of 20 months they isolated *S. aureus* from 133 of approximately 3,400 samples. Isolates from 25 animals (14 dogs, 8 horses, 1 cat, 1 rabbit, and 1 seal) and 10 humans were methicillin-resistant. Thirteen of the 17 nonequine isolates were from wounds. The other nonequine isolates were from a tracheostomy tube (dog), nares (dog), urinary catheter (cat), and a lymph node and spleen (seal). Seven of eight equine isolates were from skin lesions and the eighth was from an abdominal granuloma. All equine isolates were from one specialist equine hospital. Typing demonstrated that the nonequine isolates were indistinguishable from the most frequent MRSA type seen in Irish human hospitals. The equine isolates were a second type that has not been recognized as a cause of human infections. Typing also demonstrated that the isolates from veterinary staff members were indistinguishable from the isolates obtained from animals in their practices.

A Canadian study identified MRSA infections in horses at a referral veterinary hospital, in horses at horse farms, and in personnel in contact with the horses.[6] Nasal swabs were collected and cultured for MRSA from horses admitted to the Ontario Veterinary College Veterinary Teaching Hospital (OVC-VTH) and at intervals during hospitalization, from horses at 10 horse farms in southern Ontario, and staff at the OVC-VTH and at one horse farm. MRSA was isolated from 79 horses and 27 people. Twenty-seven (34%) of the equine isolates were from hospitalized horses, 41 (52%) were from one horse farm, and 11 (14%) were from other farms. Thirteen (16%) of the MRSA colonized horses were

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clinically ill and 63 (80%) were healthy nasal carriers. Ten of the 13 clinically affected horses had previous contact with a MRSA positive person, and two of the 13 had previous contact with a colonized horse. Seventeen of 27 (63%) infections in hospitalized horses were possibly noscomial, because the horses were culture negative at admission and MRSA was first isolated at least 72 hours after admission. MRSA was isolated from 27 of 192 (14%) people tested. One of the human isolates was from a skin lesion, but the others were from the nasal cavity of healthy individuals. All but one infected human had previous contact with MRSA colonized horses. Ninety-six percent of the equine isolates and 93% of the human isolates were closely related to an international epidemic strain that is a problem in Canada.

Because of an aggressive policy of screening, isolating, and treating patients admitted to Dutch hospitals for MRSA, the Netherlands has one of the lowest prevalences for MRSA.[7] Recently, MRSA was isolated from a 6-month-old girl, her parents who were pig farmers, another pig farmer, a boy whose father was a pig veterinarian, and a nurse at the hospital unit where the boy was admitted. Subsequently, MRSA was isolated from nasal and/or throat swabs of six of 26 farmers at a regional meeting of pig farmers, which is more than 760 times the prevalence in people admitted to Dutch hospitals. One of 30 perineal swabs and zero of ten nasal swabs from pigs on the MRSA-positive family's farm was positive were MRSA. The authors concluded that pig farming might be a risk factor for MRSA colonization.[7] Interestingly, the authors referenced a study of MRSA in food-producing animals where MRSA was not isolated from 469 pig samples.

> Studies demonstrate that clinically ill and healthy domestic animals can be colonized by MRSA. Infection can be passed back and forth between humans and domestic animals.

These studies demonstrate that clinically ill and healthy domestic animals can be colonized by MRSA. Infection can be passed back and forth between humans and domestic animals. Even though most human infections are acquired from another person, it is reasonable for a physician to request that animals in contact with MRSA-infected people be cultured when trying to identify the source and possible reservoirs of infection. In cases where the animals have skin or other lesions, the lesions, nares, and oral cavity should be cultured. In cases where the animals are healthy, the nasal and oral cavities appear to be most likely to yield positive results.

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3. Middleton JR, Fales WH, Luby CD, et al. Surveillance of Staphylococcus aureus in veterinary teaching hospitals. J Clinical Microbiology 2005;43:2916-2919.

4. Loeffler A, Boag AK, Sung J, et al. Prevalence of methicillin-resistant Staphylococcus aureus among staff and pets in a small animal referral hospital in the UK. J Antimicrobial Chemotherapy 2005;56:692-697.

5. O'Mahony R, Abbott Y, Leonard FC, et al. Methicillin-resistant Staphylococcus aureus (MRSA) isolated from animals and veterinary personnel in Ireland. Veterinary Microbiology 2005;109:285-296.

6. Weese JS, Archambault M, Willey BM, et al. Methicillin-resistant Staphylococcus aureus in horses and horse personnel, 2000-2002. Emerging Infectious Diseases 2005;11:430-435.

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Recommended synchronization protocols

Sandy Johnson, Ph.D.,
Kansas State University, Northwest Research and Extension Center, Colby

Today's synchronization protocols produce pregnancy rates in the 45 to 60 percent range, following 1 or 5 days of AI, with reports in the upper 60s not uncommon. In 1990, a research summary by Odde showed average pregnancy rates to be 30 to 40 percent. The improvement in results combined with the growing opportunities to capture value from known genetics makes this an ideal time to implement an artificial insemination (AI) and estrous synchronization program.

Many protocols are available today, but protocols that have been thoroughly tested by research and seem to be most reliable for a wide range of production situations in the United States are shown on page 7 (cows) and page 8 (heifers). Because heifers do not respond to all treatments in the same way as cows, different recommendations exist.

These protocols can be excellent tools to facilitate the use of AI in your herd. Producers that are most successful pay close attention to not only the synchronization protocol but all aspects of health, nutrition and management of the cow herd. Selecting the "best" sires to maximize profitability for your herd is up to you.

This short list of recommended protocols was developed by the Beef Cattle Reproduction Leadership Team based on available research data. This team consists of practicing veterinarians, representatives from the AI and pharmaceutical industries, and reproductive physiologists with active research programs in this area.

The primary goals of the team are to promote wider adoption of reproductive technologies among cow-calf producers and to educate cow-calf producers in management considerations that will increase the likelihood of successful AI programs.

Protocols can be grouped into three categories based on amount of heat detection: 1) heat detection and AI for six days; 2) heat detection and AI up to the time prescribed in the schedule followed by mass insemination of animals not previously detected in heat (clean-up, fixed-timed AI); and 3) a strict fixed-time AI.

For mature cows, the strict fixed-time AI will often produce pregnancy rates equal to those involving more heat detection. Studies conducted by Dave Patterson's lab in Missouri have shown similar pregnancy rates to AI with use of the MGA-Select system either with AI after observed estrus, 63.6 percent (234/368) or after a single, fixed-timed AI, 64.4 percent (261/368).

Producers that are most successful pay close attention to not only the synchronization protocol but all aspects of health, nutrition and management of the cow herd.

For GnRH systems, published reports of pregnancy rates of CO-Synch (fixed-time AI) and Select Synch (AI after heat detection) have either been higher for CO-Synch or dependent on the cycling status of the cows. The fact that pregnancy rates from systems with six days of estrus AI, with good heat detection, don't necessarily exceed single fixed-timed AI systems is a testament to the ability of systems to effectively synchronize ovulation in a majority of cows.

A concern of some producers is that more semen is used with fixed-timed AI, increasing the cost per pregnancy. If heat detection is difficult and the value of AI pregnancies is high, this may be an acceptable trade. There may be an advantage to AI after observed estrus or a combination of estrus AI and clean-up fixed-time AI. In situations where, for whatever reason, synchronization response was poor or delayed, the early heat detection provides some assessment of response. If the early response is low, plans for fixed-time AI could be dropped in favor of estrus AI. Those just starting a synchronization program and lacking confidence may wish to refine management techniques with an estrus AI program before using a fixed-timed AI system. The advantage to fixed-timed AI is that it is not dependent on detecting cows in heat; all cows get inseminated.

A concern of some producers is that more semen is used with fixed-timed AI, increasing the cost per pregnancy. If heat detection is difficult and the value of AI pregnancies is high, this may be an acceptable trade.

A key difference between the heifer and cow protocols is the use of GnRH to synchronize follicular growth. Response of heifers to GnRH has been inconsistent and may be associated with age – more mature heifers responding more like cows. In situations where all heifers will be bred based on detected estrus, GnRH is not included. When all or part of the heifers will be inseminated at a fixed time, GnRH has been included in the CIDR systems because it adds little additional cost and may be beneficial in some cases.

The single injection of PGF2_ protocol does not produce tight synchrony like some of the newer systems and only works on females with a corpus luteum; but it remains on the list of recommended protocols for heifers because it is a low cost, low risk way of getting females bred to AI sires.

In most breeding situations, a proportion of females are anestrus so most of the recommended systems include a progestin, either MGA or a CIDR. Where there are fewer anestrus animals, protocols without a progestin can be given more consideration.

The MGA-Select protocol requires MGA feeding to begin 33 days before the start of the breeding season. Even with a 60-day breeding season some cows may not have calved at the time this treatment needs to begin. For best results, the herd should average 40 to 45 days since calving at the start of MGA feeding. Successful use of MGA also requires each animal receives a daily dose. It will not work in all management situations.

While MGA and CIDRs both provide a progestin source, they are not interchangeable within a system. Each delivery system requires a different amount of time for the progestin to enter the animal's circulation and to leave.

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One of the biggest challenges in applying synchronization systems is to make sure the protocol is correctly followed. It is critical that the proper treatment is given on the correct day. With at least four different PGF2_ products (EstroPLAN®, Estrumate®, In-Synch®, Lutalyse®, and ProstaMate®) and four different GnRH products (Cystorelin®, Factrel®, Fertagyl®, and OvaCyst®), someone who does not use these terms and products daily can get them confused.

There is an improved tool to help select a synchronization protocol and apply it correctly known as the Estrus Synchronization Planner, Version Synch04, available from the Iowa Beef Center (*http://www.iowabeefcenter.org/content/ibcproducts.htm*). The CD contains general resource material, details different synchronization systems, estimates costs of treatment and, perhaps most importantly, will provide a daily calendar that shows what should happen each day. It is intended to serve as a tool to evaluate different synchronization options, outline strengths and weaknesses and help ensure that whatever system is selected is properly applied.

Workshops Available

To learn more about how these protocols work, considerations in protocol selection and expected results, the 2006 Applied Reproductive Strategies in Beef Cattle Workshops have been scheduled for August 30 and 31, St. Joseph, MO, and Oct. 3 and 4, Rapid City, SD. For details see *http://westcentral.unl.edu/beefrepro/.*

The North Central Regional Bovine Reproductive Task Force was formed in 2000 to communicate a consistent message regarding application of reproductive technologies that would result in improved results and greater adoption in the beef industry. Workshops were held in 2002 and 2004 to educate veterinarians, producers and allied industry personnel on methods and management techniques to apply reproductive technologies. A short list of recommended protocols for synchronization of estrus and ovulation in cows and heifers was developed based on available research data. This list was created by the Beef Cattle Reproduction Leadership Team. This group represents practicing veterinarians, representatives from the AI and pharmaceutical industries, and reproductive physiologists from the North Central Bovine Reproductive Task Force with active research programs in this area. The goals of the team are to promote wider adoption of reproductive technologies among cow-calf producers, to educate them in management considerations that will increase the likelihood of successful AI programs and in marketing options to capture benefits that result from using improved reproductive technologies.

See pages 8 and 9 for synchronization protocol illustrations.

Continuing Education

January 28
Canine Care Workshop

February 26
SCAAHA Small Animal Medicine Conference on Oncology

March 4
Veterinary Technicians Conference

March 6-17
VetBytes Seminar Series: Updates in Ocular Therapeutics

April 1
Progressive Practice Management: Improve Animal Care by Improving the Way You Practice

April 3-14
VetBytes Seminar Series: 24/7 Client Calls – Are There Real Problems Out There?

April 22-23
Bovine Conference on Health and Production

April 23
23rd Annual Frank W. Jordan Seminar on Pain Management

May 1-12
VetBytes Seminar Series: Diagnosis, Prevention, and Treatment of BCV Calf Scours and Other Coronaviral Infections

June 4-7
68th Annual Conference for Veterinarians and KVMA Veterinary Trade Show

Brochures for these conferences will be available approximately two months before their scheduled date.

This is the conference schedule as of Dec. 8, 2005. More conferences may be added.

For the most complete, up-to-date conference information visit our Web site at: *www.vet.ksu.edu* and click on Continuing Education, or contact: Linda M. Johnson, Ph.D., at 785-532-5696 or *johnson@vet.ksu.edu*

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FOR THE PRACTICING VETERINARIAN

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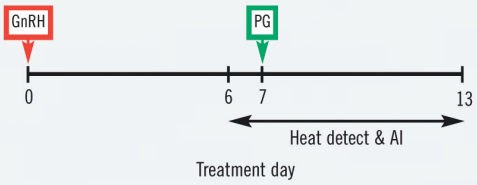
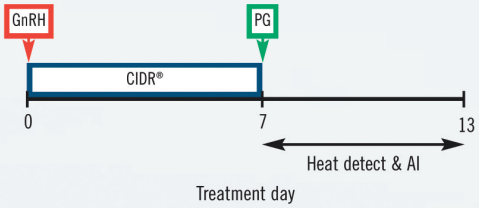
Beef Cow Synchronization Protocols

Heat Detection

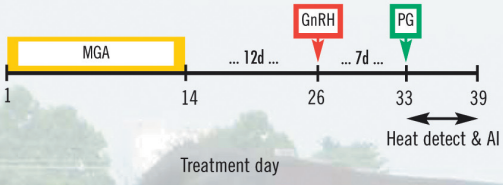
Select Synch



Select Synch + CIDR®

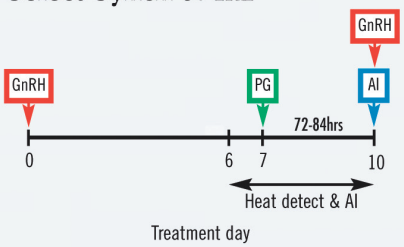


MGA® Select



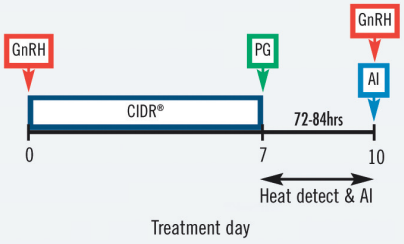
Heat Detect & Timed AI (TAI)

Select Synch & TAI



Heat detect and AI day 6 to 10 and TAI all non-responders 72 - 84 hours after PG with GnRH at TAI.

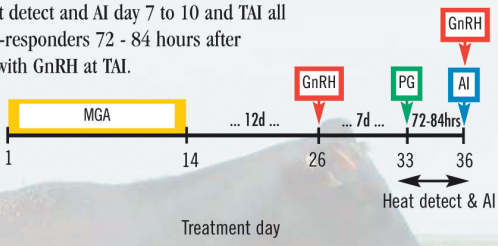
Select Synch + CIDR® & TAI



Heat detect and AI day 7 to 10 and TAI AI all non-responders 72 - 84 hours after PG with GnRH at TAI.

MGA® Select & TAI

Heat detect and AI day 7 to 10 and TAI all non-responders 72 - 84 hours after PG with GnRH at TAI.



Comparison of Protocols for Beef Cows

	Cost	Labor
Heat Detection		
Select Synch	Low	Medium/High
Select Synch + CIDR®	High	Medium
MGA® Select	Medium	Medium/High
Heat Detection & TAI		
Select Synch	Low	Medium/High
(TAI non-responders 72-84 hours after PG)		
Select Synch + CIDR®	High	Medium
(TAI non-responders 72-84 hours after PG)		
MGA® Select	Medium	Medium/High
(TAI non-responders 72-84 hours after PG)		
Fixed-time AI (TAI)		
CO-Synch + CIDR®	High	Medium
(TAI 60 ± 6 hours after PG with GnRH at TAI)		
MGA® Select	Medium	High
(TAI 72 ± 2 hours after PG with GnRH at TAI)		

- The times listed for "Fixed-time AI" should be considered as the approximate average time of insemination. This should be based on the number of cows to inseminate, labor, and facilities.

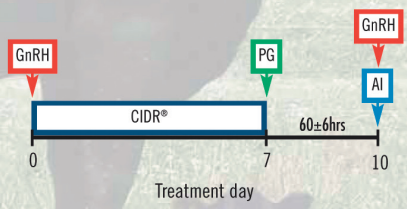
GnRH Cystorelin®, Factrel®, Fertagyl®, OvaCyst®

PG EstroPLAN®, Estrumate®, In-Synch®, Lutalyse®, ProstaMate®

Fixed-time AI (TAI)

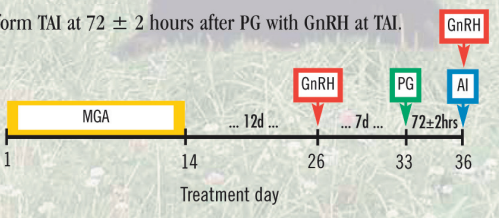
CO-Synch + CIDR®

Perform TAI at 60 ± 6 hours after PG with GnRH at TAI.



MGA® Select

Perform TAI at 72 ± 2 hours after PG with GnRH at TAI.

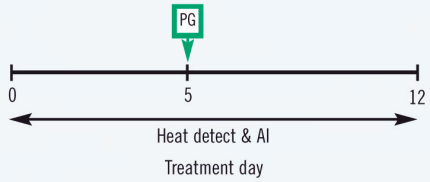


North Central Region Bovine Reproduction Task Force

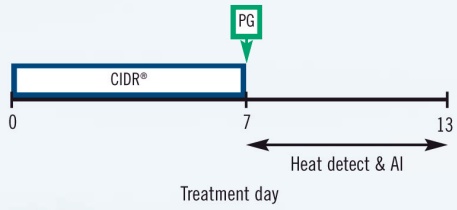
Beef Heifer Synchronization Protocols

Heat Detection

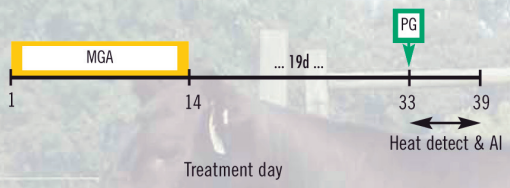
1 Shot PG



CIDR® - PG

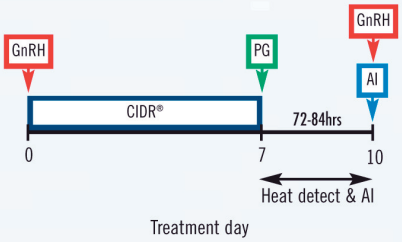


MGA® - PG



Heat Detect & Timed AI (TAI)

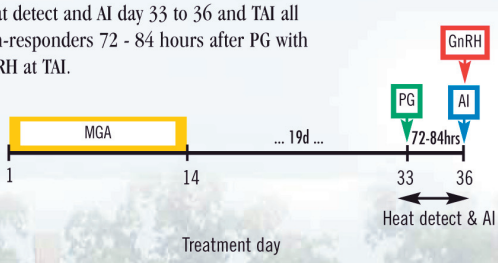
Select Synch + CIDR® & TAI



Heat detect and AI day 7 to 10 and TAI all non-responders 72 - 84 hours after PG with GnRH at TAI.

MGA® - PG & TAI

Heat detect and AI day 33 to 36 and TAI all non-responders 72 - 84 hours after PG with GnRH at TAI.



Comparison of Protocols for Beef Heifers

	Cost	Labor
Heat Detection		
1 Shot PG	Low	High
CIDR® - PG	Medium	Medium
MGA® - PG	Low	Low/Medium
Heat Detection & TAI		
Select Synch + CIDR®	High	Medium
(TAI non-responders 72-84 hours after PG)		
MGA® - PG	Medium	Medium
(TAI non-responders 72-84 hours after PG)		
Fixed-time AI (TAI)		
CO-Synch + CIDR®	High	Medium
(TAI 54 ± 2 hours after PG with GnRH at TAI)		
MGA® - PG	Medium	Medium
(TAI 72 ± 2 hours after PG with GnRH at TAI)		

- The times listed for "Fixed-time AI" should be considered as the approximate average time of insemination. This should be based on the number of cows to inseminate, labor, and facilities.

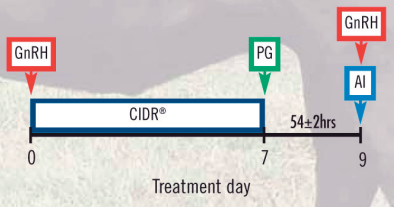
GnRH Cystorelin®, Factrel®, Fertagyl®, OvaCyst®

PG EstroPLAN®, Estrumate®, In-Synch®, Lutalyse®, ProstaMate®

Fixed-time AI (TAI)*

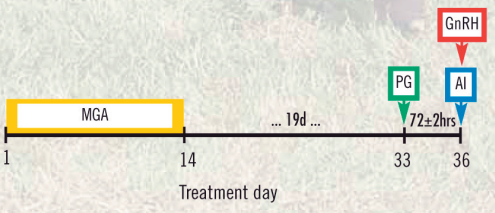
Co-Synch + CIDR®

Perform TAI at 54 ± 2 hours after PG with GnRH at TAI.



MGA® - PG

Perform TAI at 72 ± 2 hours after PG with GnRH at TAI.



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