VIRGINIA COOPERATIVE EXTENSION SERVICE

EXTENSION DIVISION - VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY - BLACKSBURG, VIRGINIA 24061

THE FOOD ANIMAL VETERINARIAN

VIRGINIA-MARYLAND REGIONAL COLLEGE OF VETERINARY MEDICINE

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Dear Food Animal Practitioners,

Two outstanding continuing education opportunities will be available right at home here in Virginia in February. If you missed AABP with the terrorist attacks,these programs can let you meet your annual CE requirement.

• The VVMA in Roanoke — February 8-10, 2002. Friday's session will be the Government and Industry section and will include presentations on West Nile Virus, Foot & Mouth Disease in the UK, Emergency Management, Johnes Disease and updates from the VA & Federal Veterinarians Offices. The Saturday session will include Food Animal topics. There will be 15 hours of CE for the two days.

• The Virginia Academy of Food Animal Practice and the Food Animal Practitioners Club are jointly sponsoring a meeting on February 22 & 23, 2002, in Blacksburg, VA. Speakers include Dr. Tom Divers from Cornell doing internal Medicine and an extensive cow reproductive program including VA Tech talent and Dr. Paul Frickie from Wisconsin College of Vet. Med. Both days will provide 15 hr of CE but there is a one-day rate for either day. The program follows:

Friday February 22:

1:00-1:30	Registration
1:30-4:30	Internal Medicine - Dr. Tom Divers
5:00 – 6:30	Beef Reproduction – The Latest Research-Bill Beal
6:30-8:00	Dinner and speaker from Monsanto Dairy Business -Tom Bailey – BST & Reproduction
8:00-9:00	Beef Nutrition/Reproduction Interaction - John Hall

Saturday February 23:

7:00-8:00	Food Animal Academy business meeting
8:00-9:00	Synchronized Ovulation in Dairy Reproduction - Dr. Paul Frickie
9:00-9:45	Manipulation of ovarian function to improve reproductive efficiency - Dr. Paul Frickie
10:00-11:00	Repro Testing – Cow/Bull side - Antonio Garcia
11:00-12:00	Ultrasound in Cattle Practice - Dr. Paul Frickie

1:00-5:00 ***Labs and Cases***

Lab 1 Dairy Ultrasound – Dairy Center – Dr. Garcia
Lab 2 Dairy Case Presentation - Dr. Divers
Lab 3 Beef Case presentations - Dr. Swecker
Lab 4 C-Section demo - Dr. Whittier
Lab 5 Obstetrics lab - Dr. Currin
Lab 6 Computer lab – PC Dart – Dr. Bailey
Lab 7 Bag of Hormones Practicum – Dr. Paul Frickie

Hope to see you at one of these exceptional programs.

W. Dee Whittier, DVM
Extension Veterinarian

Virginia Tech
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

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UNIVERSITY OF MARYLAND 1807-1856-1920

Anthrax in Animals

Anthrax has historically been an important disease in cattle and sheep in the US. Effective control methods have decreased significantly the number of cases of anthrax in domestic animals so that it has become a rare disease in most areas of the US. Currently South Dakota, Arkansas, Louisiana, Texas and California have the highest incidence of the disease in livestock.

Cattle and sheep are the most susceptible to anthrax. Horses and goats also get the disease but are more resistant and dogs and cats are apparently quite resistant.

A 1955 survey of anthrax losses in livestock in 1955 showed nearly 20,000 US cases in the prior 10 years. However, by the 1960's one hundred cases or less a year were reported. The reasons for the decrease are believed to include better quarantine and hygiene when outbreaks do occur, use of antibiotics and vaccination. Anthrax has sometimes been called "wool sorters disease". This because there have been historical outbreaks of the disease in people working in woolen mills in the US. These were generally associated with imported wools, now believed to have been harvested from animals that had died of anthrax and hence were highly contaminated with the organisms.

Outbreaks of anthrax in livestock are thought to usually be associated with spores that came from other animals dying of the disease. Because these spores do not form until some time after the animal dies the disease is not contagious. These spores, tiny encapsulated forms of the organism, may survive in the environment for many years (37 years in one case). Flooding of areas where carcasses from anthrax infected animals decomposed carries spores to low-lying pastures where many severe outbreaks of the disease have occurred.

The anthrax organisms can enter the body through a cut in the skin, by being inhaled or by being eaten or drunk. In studies, much smaller doses of the anthrax will cause infection if the organism is airborne and then inhaled. In actuality, however, the most common route of infection for livestock occurs by ingesting the spores when they contaminate feeds. Thus it is easier for livestock to get the disease by inhaling it rather than consuming it, but since having airborne spores is rare most livestock actually get the disease by eating the spores.

Sudden death is the most common observation when livestock become infected with anthrax. Following an incubation of 1-14 days (usually 3-7 days) animals develop high fevers and become very ill. Most die with hours of developing the disease. Bloody discharges from the mouth, nose, anus and other body openings are common. Bodies of animals dying from anthrax contain huge numbers of the anthrax organism at death.

Veterinary personnel should examine any animal dying suddenly. Preventing predation of the carcasses will limit the number of spores that enter the environment. If anthrax is suspected samples are typically examined before an entire autopsy is performed since this will also limit the number of spores that are formed to contaminate the area.

W. Dee Whittier, Extension Veterinarian, Cattle, VA-MD Regional College of Vet. Med.

We Need your Help

Paying the bills for printing and mailing this newsletter for Food Animal Practitioners has become increasingly difficult. Virginia Cooperative Extension no longer pays for newsletters and the financial support of the Virginia Academy of Food Animal Practitioners has been discontinued, at least temporarily. Continued publication is somewhat in doubt at this time.

You can help us in two ways. First, by sending us your e-mail address if you would like to receive the Food Animal Veterinarian electronically. This eliminates the need for printing and mailing. Please, just send us an e-mail note to aclapsad@vt.edu.

Second, you can tell us your correct mailing address if it has changed within recent months so that we aren't mailing newsletters to non valid addresses. If you no longer wish to receive the newsletter, please let us know so we can spend scarce funds on those practitioners who want to receive it.

Your assistance is important to the future of the publication of the Food Animal Veterinarian. Let us hear from you!

K.C. Roberts & W. Dee Whittier, editors

Cull Cow Trainers Improve Performance and Health of Feedlot Calves

Newly weaned calves undergo a period of depressed feed intake during the first two weeks following feedlot arrival. This depression in feed intake occurs at the same time that the calves need to initiate an immune response to pathogens and vaccines given at the time of arrival. Recent research has shown that reduction of dry matter intake normally associated with newly arrived feedlot calves is not due to a reduction in the digestive capability of the ruminal microbial population but may be due to reduced desire to eat. Prior to weaning, calves are reared in a hierarchical society, with the brood cow as the dominant figure. When newly weaned calves are grouped together in a feedlot, they are placed in an environment in which the feed and water sources are foreign, and the social hierarchy is destroyed. Cull cows may be ideal trainer animals for newly weaned feedlot calves to show the calves how to eat from a feed bunk and drink from a waterer. Due to their thin condition, efficiency of gain may be excellent for cull cows when given a feedlot receiving diet. The objective of these trials was to determine the effects of trainer animals on performance, health, and eating behavior of newly arrived feedlot calves.

Trials were conducted to determine the efficacy of using trainer animals to improve the health and performance of newly arrived feedlot calves. For all trials, trainer animals were given 3 weeks to adapt to the feedlot before arrival of the feeder calves and initiation of the trials. Trainer animals were present with newly received feedlot calves for 14 days after arrival and then were removed from the pens for the remaining 14 days of the experiments.

In Trial 1, trainer animals were six crossbred beef steers and six mature cull beef cows. Newly received calves were allotted to 18 pens with 10 calves/ pen. Six pens contained a trainer steer and six pens contained a trainer cow. During week 1, calves with trainer cows and steers gained weight more rapidly ($P < 0.1$ 0) than those without a trainer animal (1. 1 2 vs 0.67 kg/d, respectively). During week 2, overall gains did not differ ($P > 0.20$) among treatment groups. Morbidity was 16.7 for control calves, 28.3% for calves with trainer steers, and 8.3% for calves with trainer cows. Four of six trainer steers required antibiotic treatment for respiratory disease. On day 1, a greater ($P < 0.05$) percentage of calves in the trainer cow group (81.7%) were observed eating during the first 30 minutes after feeding compared with either the steer trainer group (60%) or the control group containing no trainer animal (48.3%). This trend continued on day 2 but was not evident on day 3 or 7.

Similar procedures were used for the subsequent trials, except 12 trainer cows (no steers) and 24 pens were used. In Trial 2, overall gains were 10% greater ($P < 0.06$) and final BW was higher ($P < 0.01$) for calves with trainer cows than for those without trainers. Trainer cows resulted in a substantial reduction ($P < 0.01$) in calf morbidity compared with calves housed alone. In Trial 3, trainer cows did not improve performance or health of newly received calves. More ($P < 0.07$) calves with trainers than without were eating 5 minutes after feeding on days 1, 2, 4, and 8.

Use of cull cows as trainer animals for newly received feedlot calves affected calf eating behavior during the first few days after calf arrival. Calves housed with trainer cows had improved gains and health status in some trials, but the response was not consistent. When the presence of trainer animals improved gains, incidence of morbidity was decreased. Using feedlot-adapted steers as trainer animals was not beneficial and, from a health standpoint, may not be advisable.

Taken from: Loerch, S. C. and F. L. Fluharty J Anim Sci 78:539-545, 2000, as reported in VetMed, Vol 7, Issue 3 May 2001, Iowa State University, Ames, IA

Calf Removal Improves Conception Rates

Less than 6% of beef cows in the United States are artificially inseminated each year. An important reason why so few are artificially inseminated is the problem of estrus detection. An estrous synchronization protocol that induces estrous cycles, is easy and inexpensive to administer, can be administered in a short period of time, and synchronizes follicular development to allow timed insemination is needed by the beef industry.

Timed insemination with the Ovsynch protocol results in higher conception rates. The Ovsynch protocol requires handling cows three times for injections (Days 0, 7, and 9) and a fourth time for mass insemination (Day 10). Variations in the Ovsynch protocol that included timed insemination at the same time as the third injection on Day 9 (CO-Synch) resulted in lower conception rates compared with insemination 24 hours later. Temporary calf removal for 48 hours has generally increased conception rates of beef cows to a timed insemination with other synchronization protocols. Our hypothesis was that 48-hour calf removal would increase conception rates to a timed insemination with the Ovsynch and CO-Synch protocols that would be acceptable to beef producers. Thus, the objective of this research was to evaluate effects of 48-hour calf removal on conception rates of cows synchronized using the Ovsynch or CO-Synch protocols.

Beef cows (n = 473) from two locations were randomly allotted to one of four treatments for synchronization of ovulation. Ovulation synchronization protocols included the Ovsynch protocol with (n =114) or without (n =123) 48-hour calf removal from day 7 to 9. The Ovsynch protocol included administration of GnRH (100 ug; i.m.) on day 0, PGF2a (25 mg; i.m.) on day 7, and GnRH (100 ug; i.m.) with timed insemination on day 10. The CO-Synch protocol was the same except that insemination was on day 9. Blood samples were collected from all cows on day -10 and day 0 for analysis of serum progesterone. Cows with at least one serum progesterone concentration greater than 1 ng/mL were considered to be cyclic at the time of treatment.

Conception rates of cows that received the CO-Synch + calf removal, Ovsynch + calf removal, CO-Synch, or Ovsynch protocol (63, 61, 54, and 52%, respectively) were not different. Conception rates were not different among CO-Synch- and Ovsynch-treated cows; however, both estrual status and 48-hour calf removal affected conception rates. Conception rates of cyclic cows (66%) were greater (P = 0.01) than those of anestrous cows (53%), regardless of which synchronization protocol was used. When data were pooled across synchronization protocol, conception rates of cows with 48-hour calf removal (62%) were greater (P = 0.09) than conception rates of cows without calf removal (53%).

The CO-Synch + calf removal protocol induces a fertile ovulation in cyclic and anestrous cows, requires handling cattle just three times, results in high conception rates from timed insemination, and should be a useful program for synchronization of ovulation in beef cows. However, the beneficial effects of calf removal appear to be age-related and conception rates increased with increasing age. The percentage of anestrous cows before synchronization decreased with increasing age. Calf removal appears to have been more beneficial for 3- and 4-year-old cows than for first-calf heifers (2year-olds) and older cows.

Taken from: Geary, T. W., et al - J Anim Sci 79:1-4, 2001 , as reported in VetMed, Vol 7, Issue 3 May 2001, Iowa State University, Ames, IA

Diagnostics of Cystic Ovarian Disease in Cattle

Cystic ovarian disease is a major reproductive disorder in cattle, with up to 10% of dairy cows being affected during the postpartum breeding period. Cystic ovaries have been defned as anovulatory follicles with a diameter greater than 25 mm that persist on the ovary for 10 days in the absence of a corpus luteum. Cysts can occur as single ormultiple structures on the same ovary or on both ovaries. By palpation per rectum, the cysts can be further classified into follicular cysts, which are thin-walled, fluctuating structures, or luteal cysts, which are usually single structures having a thicker wall. However, recent evidence from ultrasound studies has shown that not all cows with cysts conform to this definition. It appears that some cysts are less than 25 mm in diameter and do not always persist for as long as 10 days.

The aim of this investigation was to assess the accuracy of ultrasound, palpation per rectum or plasma progesterone, for differentiating between follicular and luteal ovarian cysts. Holstein cows from 10 commercial dairy herds with an average of 80 cows each were studied. During scheduled fertility visits, cows with irregular reproductive histories (anestrus or nymphomania) were selected by farms for examination by one clinician. In total, 46 cows with cysts were examined. The presence of a cyst was initially detected by manual palpation per rectum of a large (>25 mm) fluid-filled structure on the ovary in the absence of a corpus luteum The cysts were designated as either follicular (thin walled) or luteal (thick-walled). The ovaries were then immediately examined ultrasonographically. The cyst was classified as either follicular (with a non-echogenic antrum and a wall <3 mm thick) or luteal (with a non echogenic antrum plus possible grey patches within the antrum and a wall >3 mm thick). Plasmaprogesterone concentrations were measured by radioimmunoassay. A plasmaprogesterone cut-off value of less than 0.9 ng/ml was used for follicular cysts and more than 0.9 ng/ml for luteal cysts.

On the basis of agreement between the different methods,25 of the 46 cases examined were diagnosed as follicular and 14 as luteal cysts; for the other seven cases the methods disagreed. The use of ultrasound was more accurate in diagnosing follicular cysts than luteal cysts, and combined with plasma progesterone concentrations gave the most accurate assessment of cyst type (92% for follicular cysts and 82% for luteal cysts). The mean (se) plasma progesterone concentration was lower in the cows with follicular cysts than in those with luteal cysts (0.29 [0.05] vs 3.90 [0.63] ng/ ml; $P<0.05$). Luteal cysts had thicker walls (5.3 [0.04] vs 2.5 [0.2] mm; $P<0.0001$), and the wall thickness of all the cysts was positively correlated with plasma progesterone concentration ($r=0.52$, $P<0.0004$). Cows with luteal cysts had more additional follicles greater than 5 mm in diameter, the mean estradiol concentration was 7.9 (1.8) pg/ml compared with 24.2 (3.1) pg/ml ($P=0.002$) in cows without other follicles greater than 5 mm in diameter on either ovary.

Mean plasma progesterone concentrations were significantly higher in cows with luteal cysts, walls of luteal cysts were thicker, and progesterone concentrations were positively correlated with wall thickness for both types of cyst, in agreement with several other studies. In cows with follicular cysts, comparisons of ultrasound and estradiol measurements were useful. High concentrations of estradiol suppress the secretion of follicle stimulating hormone and the emergence of follicular waves is inhibited. In the present study, the examination of total follicular populations gave an indication of the steriodogenic nature of the large thin walled cysts. If no other follicles greater than 5 mm in diameter were present in either ovary, the concentration of estradiol was high.

Taken from: Douthwaite, R., and H. Dobson VetRec 147:355-359,2000
As reported in VetMed, Vol 7, Issue 1, January 2001, Iowa State University, Ames, IA

Milk Progesterone as an Aid in Bovine Reproductive Management

Milk and serum were collected from cows at breeding and twenty days postbreeding for progesterone analysis as part of a research project funded by the Pennsylvania Department of Agriculture during 1999 and 2000 to study bovine reproductive efficiency. Although other studies, listed in the references, have evaluated this technology during the past 20 years, a program focused on reproductive management, such as this, should include progesterone analysis to assist in evaluation of heat detection accuracy, pregnancy diagnosis, and early embryonic death. For these purposes milk progesterone determination at breeding and 20 days post breeding was performed on all cows, and serum progesterone was added for a limited number of cows as a quality control feature. The TARGET cow-side test kit employing the enzyme linked immunosorbant assay procedure was used to measure milk progesterone. The laboratory radioimmunoassay technique was used to determine serum progesterone as a gold standard for evaluating the TARGET test results.

Previous studies have shown that confirmation of estrus and identification of non-pregnancy are practical clinical applications for milk progesterone analysis. Samples taken at 20 to 24 days post breeding are only 70 to 80 % accurate in detecting pregnancy, but nearly 100% accurate in detecting non-pregnancy (1). Milk progesterone results at breeding have also shown that approximately 6 to 13 % of animals bred are not in true estrus (1,4). It has also been shown that use of the test for early detection of non-pregnancy both improves reproductive performance of the herd and is economically profitable (3). Details of the on farm milk ELISA test procedure for progesterone are shown in reference 4. The test is recommended for estrus confirmation when it is based on secondary signs or heat detection aids and for cows previously diagnosed as pregnant (4). Interestingly, the progesterone concentration rises faster in early pregnancy in milk than plasma (5). As a result, the TARGET test may be a quicker indicator of pregnancy than the serum test. Some investigators have used the test in post partum cows to identify follicular cysts, inactive ovaries, and persistent corpus lutea (6).

With regard to pregnancy detection, the results of this study are reasonably consistent with those shown above. In a population of 228 cows, 52 or 22.8% of the cows with twenty day post-breeding serum progesterone consistent with pregnancy had milk progesterone levels suggestive of nonpregnancy. Assuming that the serum RIA test is highly accurate, this conforms to the 70 to 80 % range for accuracy in detecting pregnancy as shown above. On the basis of a single TARGET result 77.2% of tested cows would have been correctly identified as pregnant. This is not acceptable for making reproductive management decisions that might abort existing pregnancies. In a similar population of cows, only 5 or 2.2% of the cows with serum progesterone suggestive of non-pregnancy at twenty days postbreeding and negative rectal palpations had milk progesterone results that indicated pregnancy. Because retesting was recommended for three of the five the possibly exists that only two or .9% of these cows would have been falsely identified as pregnant. This figure is comparable to nearly 100% accuracy in detecting non-pregnancy quoted in the literature.

The project provided a rare opportunity to determine, with reasonable accuracy, the rate of early embryonic death (EED) for cattle, defined as death of a conceived embryo by forty- two days. Because this usually occurs prior to pregnancy confirmation by rectal palpation it is seldom detected. Embryonic death is defined for this study as sequential confirmation of estrus by low milk or serum progesterone on the day of breeding, of pregnancy by high serum progesterone at day twenty postbreeding, and of non-pregnancy at about forty five days by rectal palpation. Using these criteria, in a population of two hundred twenty five cows, 54 or 24% experienced conception followed by early embryonic death. This number agrees with published results suggesting an EED rate of about 30 %. Factors thought to contribute to this mortality include infectious agents, genetic errors due to inheritance or de novo mutation, excessive heat, negative energy balance, and hormonal imbalance.

Using the TARGET test milk progesterone and serum progesterone results from the day of service as an indicator of heat detection accuracy, 16 (7.0%) and 13 (5.7%) cows, respectively, out of a population of 228 were not in heat at the time of service. While these numbers agree with each other and previous results in the literature, only 4 cows are common to both groups. The results cast serious doubt on the validity of the milk progesterone test for estrus confirmation because 8 of the 16 cows supposedly not in heat at the time of breeding became pregnant. By contrast, only 2 of the 13 cows not in heat based on serum progesterone became pregnant. These results indicate that in our hands the TARGET test performed on milk samples taken on the day of breeding would not be acceptable indicators of heat detection accuracy. References: Available on request.

Tom Drake, Penn State Veterinary Extension and Mike O'Connor, Penn State Dairy aIld Animal Science, As reported in Herd Health Memo, May 2001, Penn State, University Park, PA

New Diagnostic Test to Identify Cattle Persistently Infected with BVD

Bovine viral diarrhea virus (BVD) infection of cattle causes many syndromes. These include embryo deaths, abortions, congenital anomalies, mucosal disease, and hemorrhagic syndrome. In addition, this virus is immunosuppressive and predisposes infected cattle to sickness from many other infectious disease agents. For example, an increased incidence of abortions due to Neospora caninum was seen in Canadian beef herds experiencing peracute BVD. It is also considered a respiratory tract virus and an important contributor to the bovine respiratory disease (BRD) complex.

The most common way BVD infection is introduced into a cattle herd is by the purchase of persistently infected (PI) animals, such as replacement heifers. PI animals almost continually shed massive amounts of viral particles in all bodily secretions. Fetuses in the first trimester of pregnancy that are exposed to BVD virus become immunotolerant to the virus and are born PI animals. The infection is then maintained in the herd by the new PI calves, which are big threats to obtaining fertility goals because they shed virus during the breeding season. An accurate test is needed to detect PI animals.

Two diagnostic tests are used to detect PI animals. Of these, virus isolation (VI) on serum or buffy coat samples is the gold standard. A 96 well microisolation-system is used by many laboratories. BVD virus is detected in infected cells by an immunoperoxidase technique. A disadvantage of VI is that false negatives can occur in young calves that have significant concentrations of passively acquired antibodies. The PCR test on buffy coat cells eliminates the false negative problem; however, with either PCR or VI, a positive animal means that a repeat sample must be taken 2 weeks later to determine if the animal is persistently infected or an acute BVD case.

The Texas Veterinary Medical Diagnostic Laboratory at Amarillo (806-353-7478) now offers a new, improved test for detection of PI cattle. It is the immunohistochemical (IHC) skin test. The squamous epithelium of hair bulbs is loaded with huge amounts of BVD virus in PI animals. A small piece of ear can be very easily collected with an ear notcher and placed in formalin. The lab stains sections of the skin with an immunoperoxide labeled monoclonal antibody against BVD virus, and the sample is read with a light microscope. Passively acquired antibodies do not interfere with the IHC test, and a repeat sample is not needed to declare an animal persistently infected. Pathologists can even tell an acute BVD case from a PI animal based on the amount of staining

The practicality and accuracy of the IHC test for BVD is exciting. I've tested three beef herds in Texas by sampling all of the calves and yearlings. One herd was experiencing calf health problems, and the other two were not BVD-suspect herds. No PI calves were found. The IHC test is a significant advancement in diagnostics and control of BVD. A closing caution, though: A major weakness in biosecurity against BVD | virus is that veterinarians have no practical test that will detect a PI fetus in a purchased replacement heifer.

Wiske, Steve. (Veterinary Quarterly, Veterinary Extension, College of Veterinary Medicine, TAMU 2001:17:2, , As reported in Animal Health Spectrum Volume 12 No.3, Fall 2001, Mississippi StateUniversity

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