Colorado State University Veterinary Diagnostic Laboratories

LabLines

Volume 1, Number 2 **Spring 1997**

Letter from the Director

Welcome to our second issue of LabLines! In this edition, you will find informative and interesting articles on bovine virus diarrhea, polioencephalomalacia, trace minerals in cattle, plant toxicities, Brucellosis in rams and dogs, porcine reproductive and respiratory syndrome, *Actinobacillus pleuropneumonia* in pigs, canine heartworm, feline herpesvirus and equine respiratory viruses. We hope you find the articles useful.

The Diagnostic Laboratory continues to change to meet your needs. Our External Advisory Committee has provided us with many new ideas for improved service, and client and staff input also have brought about positive changes. New advances in our services include:

- Increased accessibility and ease of use of the clinical pathology laboratory with reduced prices for cytologies.
- A courier service for Fort Collins, Greeley, and other local clients with continued Federal Express courier service for those outside our local area.
- A new antimicrobial susceptibility testing system in bacteriology.
- An automatic faxing procedure for preliminary reports to provide you with more rapid results.
- An updated User Guide with complete, current test availabilities, fees, and submission information.
- Continued development and implementation of new test procedures in microbiology and other sections.

If you have any questions or comments regarding the articles in this issue of LabLines, or questions about sample submissions, our services, or any other comments, please call us at 970-491-1281 or email us at jkammerz@vth1.vth.colostate.edu. Your comments are always welcome!

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WHAT TO DO ABOUT BVD? **Jim Collins and Bob Glock**

Producers and veterinarians ask what can be done to prevent the occurrence and spread of bovine virus diarrhea (BVD). First, some emerging facts about the biology of BVD virus:

- BVD is not just BVD. The virus has a high rate of variation in the field with different *strains* of the virus having differing potential to cause disease. Some are more virulent than others. In particular, BVD type 2 has been associated with severe disease outbreaks, especially in poorly vaccinated herds.
- No vaccine is 100% effective against any disease and BVD vaccines don't effectively protect against all strains. However, with BVD, the variation that arises in the field means that vaccines may be getting less efficacious. Many BVD vaccines aren't routinely updated with fresh field strains, but these vaccines are still the best preventive measure we can take.
- Recognizing the many clinical forms BVD can take is very difficult--some would say impossible. This complex includes existence of persistently infected (PI) animals arising at birth, which may show *no clinical signs*. Yet, these animals may be an important source of variant viruses and may succumb to a variety of health problems, including mucosal disease. The PI animal is probably the most important source of virus exposure to other animals.

What do we do? Well, the best we can, given the circumstances. We must use vaccines and monitor for disease. With regard to vaccines, Dr. S. Bolin, a noted BVD expert, says, "Vaccines containing inactivated type 1 BVD virus provide at least partial protection from type 2 BVD virus, but this protection appears to be of limited duration. "...." immunity conferred by MLV (type 1) BVD vaccines is likely longer."

The new genotype of BVD virus, type 2, has been increasingly recognized and now appears to be widespread in the United States. We have isolated it in Colorado herds and found serological evidence for its circulation in herds. It can infect herds that have experienced the type 1 strain because of imperfect immunity to the type 2 strain. Type 2 shows the same variation in disease-causing potential as type 1. It's been responsible for severe BVD outbreaks, including crossing the placenta in heifers and cows vaccinated with type 1 vaccines. Most BVD vaccines are made with only type 1 BVD.

Laboratory testing helps in confirming infections with BVD virus and with identifying PI animals. The newest and most cost-effective test is the "BVD ELISA," a shortened virus isolation that works well for PI animals by testing whole blood or serum. PI animals carry a high virus load in the blood (~10^5 infectious doses/ml blood), enabling a shortened virus isolation as an efficient diagnostic tool. Virus is also excreted in nasal exudate, feces, and urine at lower levels and can be detected by traditional virus isolation procedures. Animals that test positive should be tested a second time, as virus may transiently infect healthy animals. Antibody testing at the same time would confirm this.

Identification of PI animals in a herd warrants further investigation. Are there higher than usual numbers of open heifers or cows? Are some of this year's calves doing poorly? Do you have other infectious disease problems at an increased level? BVD may contribute to all of these conditions.

Perhaps you have suspicions of underlying BVD infection given some of the above observations. Most of the screening for BVD we perform is for herds with various health problems that continue for an abnormally long period of time or do not resolve. Vaccines may or may not be routinely used. In one instance, an entire dairy herd was screened and found to be negative; yet BVD was still suspected, and one calf died with intestinal BVD lesions. It turned out that purchased replacement heifers were not screened and two were subsequently identified as BVD carriers. In another instance, an outbreak of mucosal disease occurred in a pen of feedlot animals. Carriers were identified and sent to slaughter.

In addition to the BVD ELISA, we are investigating two new procedures for BVD testing. One is the "BVD capture ELISA" and the other is detection of virus genes (in animal specimens) with polymerase chain reaction (PCR). The capture ELISA hopefully will shorten the diagnostic testing time further, and enable results to be obtained in two days, rather than one week. The PCR test will make feasible identification of the type of BVD; 1, 2 or a new type.

BVD ELISA: Submit Purple- or red-top blood tubes. Fee--$5 each for 1-50; $2.50 each for 50-200; $1.25 each for over 200. Please consult us ahead of time.

SULFATE-ASSOCIATED POLIOENCEPHALOMALACIA

Dan Gould and Dwayne Hamar

Polioencephalomalacia (PEM) is a common neurologic disorder of ruminants characterized by impaired vision, depression, ataxia, and, in severe cases, recumbency and paddling. The main lesion is necrosis of cerebrocortical tissue. Early lesions are grossly detectable under UV illumination as cortical autofluorescent zones, while later cavitation is grossly evident. Although usually thought to be related to alterations in thiamin status, the lesion can occur in acute lead poisoning and sodium toxicosis/water deprivation. In recent years, we have increasingly recognized an association between PEM and high sulfur intake.

Gross Photo of PEM Brain

Many ranches and feedlots in our area have concentrations of sulfate in the water that by themselves exceed the

recommended levels of sulfur intake for cattle. We found that forage also can be high in sulfate. Other feed ingredients potentially high in sulfur include cruciferous plants and by-products of corn, sugarbeet, and sugarcane processing. According to NRC nutritional guidelines, the maximum recommended level of sulfur is 0.4% as dry matter. To assess total sulfur intake, we must consider the intake of water and dietary ingredients.

When sulfur intake is too high, ruminal organisms produce excess hydrogen sulfide (H_2S), a potential toxicant with effects similar to cyanide. Pathologic production of ruminal H_2S is associated with the occurrence of PEM. In our region, most outbreaks of PEM are associated with high environmental or dietary sulfur. With the aid of a device suitable for field use to estimate ruminal H_2S concentrations, we find that after the onset of clinical signs of PEM, cattle have ruminal H_2S levels often within normal ranges. However, if we sample pen or pasture-mates exposed to the same conditions, we often can demonstrate pathologic ruminal H_2S levels.

The diagnostic strategy for an outbreak of PEM should include the following submissions:

- Brain in formalin for histopathologic demonstration of the lesion; include a cerebral hemisphere and the whole brainstem (medulla, cerebellum and midbrain [the part hidden by the posterium aspects of the cerebral hemispheres]). With this, we also can rule-out thrombotic meningoencephalitis (*Hemophilus* septicemia) and listeriosis.
- Opposite cerebral hemisphere on icepacks to rule-out sodium toxicosis/water deprivation and to use for microbiology testing.
- Kidney or liver on icepacks to rule-out lead poisoning.
- Quart of water source of affected animals.
- Whirl-Pak of each dietary ingredient or several Whirl-Paks of a mixed ration.
- Blood samples collected in green-top tubes (heparin), transported chilled and then frozen at the first opportunity to evaluate for total blood thiamin.

This approach serves as a diagnostic panel and can aid in earlier detection and removal of toxic substances or sources contributing to excess sulfur intake.

PEM Screen: Submit tissues as described above. Fee--$75-$150.

ASSESSING TRACE MINERAL (Cu, Se, Zn) STATUS IMPORTANT TO THE HEALTH OF RUMINANTS

Dwayne Hamar and Cathy Bedwell

Copper (Cu), zinc (Zn) and selenium (Se) are required trace minerals and deficiency syndromes in ruminants are well-described. Cu and Se may be toxic, however, Zn has low toxicity. Indications of deficiency or toxicity for these three trace minerals are found in our area.

Signs of Cu deficiency vary but include bleached haircoat, poor performance, and potentially decreased immune response and conception rates. Copper toxicity results in jaundice, hemolysis, and liver necrosis. Serum and/or liver Cu levels may be used to demonstrate Cu deficiency. Serum levels indicate circulating Cu concentrations whereas liver levels indicate Cu storage. In Cu toxicosis, serum Cu levels and serum hepatic enzymes will start to increase about two weeks prior to clinical signs. However, liver and/or kidney levels are the most reliable indicators of toxicosis. Since blood, serum, and plasma have similar Cu concentrations, hemolysis or extended contact with RBCs is not a major problem for serum or plasma Cu analysis.

Selenium is involved in immune responses and as an antioxidant factor (as glutathione peroxidase). Se toxicity results in hair loss and abnormal hoof growth. Liver and blood Se levels or blood glutathione peroxidase (GSH.Px) activity are the best indicators of Se adequacy. Blood GSH.Px activity is not useful for diagnosing Se toxicosis. Hair, hoof, and blood Se levels are useful for confirming toxicosis. Most of the blood Se is associated with RBCs, thus whole blood better reflects the past few months nutritional status. Serum levels increase and decrease almost daily and are of questionable value.

Zinc is required for protein and nucleic acid synthesis which is important in immune responses. Severe Zn deficiency results in parakeratosis, reduced conception rates, and weak hoof walls. Zinc toxicosis is not common in ruminant animals. Liver Zn levels are more difficult to interpret than other trace mineral levels. Because serum levels decrease only when there is a severe dietary deficiency, the best indicator of Zn status is analysis of the diet. Erythrocyte Zn levels are higher than serum or plasma so hemolysis and/or extended contact with RBCs increases serum/plasma Zn. Because of this, remove serum/plasma from the clot/RBC as soon as possible after sampling before submitting or shipping

samples for Zn analysis. There are also indications that some rubber stoppers contain Zn. Therefore, avoid contact of the blood, serum or plasma with rubber stoppers or use royal blue tubes.

The potential value of blood, serum or plasma analysis for assessing micronutrient status of animals depends as much on proper sampling and handling of samples as on the care and accuracy of the analytical chemist. Place tissue samples for all analyses in separate containers for each animal and tissue. Analysis of the diet for trace minerals may aid in detecting micronutrient deficiencies/toxicities and in formulating supplements.

Cu/Zn/Se analysis--Submit blood, serum or tissues as described above. Fee--$4-$12.

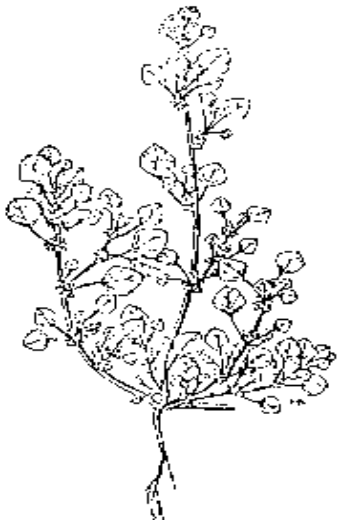
CASE HISTORY OF SUCKLEYA SUCKLEYANA POISONING

Charles Dickie
Rocky Ford Diagnostic Laboratory

In Spring of 1996, about 200 head of range cattle were on dry prairie pasture west of Rocky Ford. Three cows were found dead and no others appeared sick. Necropsy, microbiology, chemistries, and histopathology did not establish a diagnosis. Three days later, another cow was found dead, and again, nothing significant was found at necropsy. Assuming that this was a typical history for plant poisoning, the owner and I walked the pasture, searching for poisonous plants. We found *Kochia scoparia* and Russian thistle, but they did not appear to have been grazed.

In a natural depression that held water during rainy times, we found Snow-on-the-mountain, cocklebur, more kochia, Russian thistle, and some pigweed. At the upper end of the depression, we found poison suckleya and it showed evidence of being consumed. Since the animals had died so acutely, and nitrate tests on animals had been negative, we nominated the suckleya as the candidate. Furthermore, the other poisonous plants did not show signs of grazing as the suckleya did. The suckleya was disced under and no further problems occurred. The cyanide found in this plant can kill extremely quickly, with as little as one handful of plant material proving deadly for an 800-pound animal. We have seen death caused by a handful of material present in the reticulum, with none being present in the rumen.

Suckleya suckleyana is an annual, succulent, mostly prostrate plant. The stems are reddish and fleshy. Leaves are alternate, broadly triangular, and have dentate margins. The plant is considered rare but is common locally in southeastern Colorado. It's found in drying water holes, drying shallow ponds, on pond margins as water recedes, or occasionally along stream banks. The plant is poisonous because of its hydrocyanic potential. Wide variation in cyanide content occurs in plants in a given population.



Suckleya suckleyana

Brucella ovis IN RAMS

Darrell Schweitzer
Western Slope Diagnostic Laboratory

With the arrival of Spring, I want to remind practitioners and producers alike that this is the season during which testing rams for epididymitis caused by *Brucella ovis* can be the most effective for eliminating the disease in herds. At this time, rams are less sexually active, so removing positive animals will result in their having little opportunity to transmit the disease. Also, at this time, rams are less likely to be in the incubation stages of disease, so false negatives are less likely.

Congratulations to the industry on the strides made so far in eliminating this costly disease. In looking over records from samples tested by us in the last 10 years, an overall decline in the numbers of positive animals as well as herds with animals testing positive is evident.

	All Samples		Colorado		Wyoming	
Year	% Pos	# + Herds	% Pos	# + Herds	% Pos	# + Herds
1987	9.5	294	10.0	110	7.6	65
1988	8.4	281	6.0	59	23.1	12
1989	32.7	196	20.3	57	4.1	33
1990	5.2	97	4.5	17	8.1	32
1991	5.2	60	4.5	12	6.5	27
1992	3.7	54	4.8	17	3.6	23
1993	3.5	47	2.9	11	2.9	18
1994	4.6	27	10.7	12	0.8	6
1995	7.4	21	11.9	5	6.3	9

1996	3.3	17	0.6	2	3.7	5

While these figures are encouraging and I believe the trend is real, there are likely other reasons for these declines. During the early years, we tested nearly all the samples. In later years, other laboratories began performing the test so the figures represent only those rams tested by us. Another bias is that fewer producers existed in later years. Some herds with positive animals were dispersed, presumably principally to slaughter. Nevertheless, in following test results from many specific premises, herds with early positive animals have been cleaned up and remained negative.

Positive animals still do exist and pose an ever constant danger of re-infecting herds in which the disease has been eliminated by testing and culling. Reintroduction of positive rams into a naive population has resulted in several instances of large numbers of animals becoming positive in a short time. The higher percentages of positive animals seen in Colorado in 1994 and 1995 were the result of such disasters.

We need continued vigilance and testing to maintain the advances made thus far.

B. ovis: Submit 1.0 ml sera to us at the Western Slope Diagnostic Laboratory. Fee--$3 each.

PORCINE REPRODUCTIVE AND RESPIRATORY SYNDROME (PRRS)

Bob Glock

This viral disease of swine has become the most challenging health problem in the swine industry. The virus is known as PRRS virus, a RNA Arterivirus. These viruses commonly are noted for their ability to change virulence and antigenicity patterns. PRRS does not appear to be an exception and the disease is clinically diverse.

This swine disease became significant over the past 15 years. PRRS appeared quite suddenly in both the United States and Europe. Marked strain differences, especially between the United States and Europe exist. Clinical signs predominantly include reproductive failure and respiratory disease.

Reproductive failure may be mild and identified primarily by infertility, abortion, weak piglets, and increased neonatal mortality. Clinical identification often results from observing decreasing numbers of pigs weaned. However, severity may be much greater with abortion storms, high neonatal mortality, and increased sow deaths. The respiratory form is generally recognized in nursery and grower-aged pigs as an increase in mild respiratory disease accompanied by increased death loss due to other secondary agents.

Diagnosis is based on virus identification in tissues or body fluids, and by serology. We currently offer serology based on the ELISA test. We report the results of ELISA serology as positive or negative along with S/P (sample to positive) ratio. We classify the sample as negative if the S/P ratio is less than 0.4, positive if the S/P ratio is greater than 0.4. We are developing virus isolation and identification procedures. The virus itself is sometimes somewhat elusive in diagnostic situations due to strain variability and infection which may persist for different times during recovery. Identification of infected herds can be enhanced by communicating with us before submitting specimens.

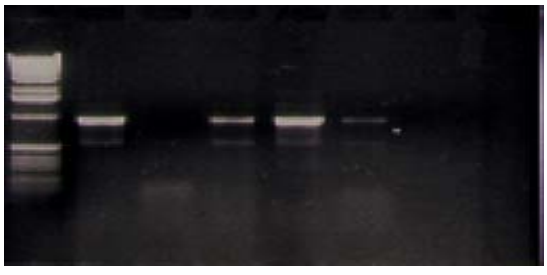
PRRS ELISA: Submit 1.0 ml sera, test performed once a week. Fee--$4. Call for special arrangements.

UPDATE: DIAGNOSIS OF *ACTINOBACILLUS PLEUROPNEUMONIAE*

Claudia Gentry-Weeks and Mike Jessen

The bacteriological identification of *Actinobacillus pleuropneumoniae* from swine can be challenging for any veterinary diagnostic laboratory. Due to the severity of respiratory disease caused by *A. pleuropneumoniae* and its pathogenic potential, we need to differentiate *A. pleuropneumoniae* isolates from other V-factor dependent bacteria such as *Haemophilus parasuis, Haemophilus* species "minor group," and taxons C, D, E, or F which can reside in the upper respiratory tract of healthy pigs. (*Haemophilus* species "minor group," taxon D plus E, and taxon F have been renamed *Actinobacillus minor, Actinobacillus porcinus,* and *Actinobacillus indolicus*, respectively).

Agarose Gel of PCR Amplified Fragments From
Actinobacillus pleuropneumoniae



A. pleuropneumoniae isolates can be readily classified as biotype 1 or 2 based on their dependency for V-factor for growth. However, due to the phenotypic variation of these bacteria, routine

biochemical identification schemes are not reliable for absolute identification of *A. pleuropneumoniae*. To confirm the isolation of *A. pleuropneumoniae*, we have implemented a PCR (polymerase chain reaction)-based identification method adapted from procedures developed by Dr. R. Levesque and co-workers, and Dr. B. Fenwick. Bacterial colonies of suspect *A. pleuropneumoniae* isolates (biotypes 1 and 2) are identified by amplification of specific DNA sequences and generation of a DNA fragment of a specific size. We are currently testing suspect *A. pleuropneumoniae* isolates on a case by case basis using the PCR reaction.

Actinobacillus pleuropneumonia culture and PCR: Submit lung tissue or nasal swab. Fee--$21.

CANINE BRUCELLOSIS

Bob Jones and Cindy Hirota

During the past year, we aided in the diagnosis of canine brucellosis in Colorado. Three large kennels of breeding dogs were eventually identified as infected and quarantined by the state veterinarian.

Canine brucellosis is a serious, contagious bacterial disease caused by *Brucella canis*. Clinical manifestations vary, but abortions and infertility in bitches, and infertility and epididymitis with scrotal dermatitis in males are common signs. Infection commonly exists without overt manifestations and inapparently infected animals are an important source of transmission, especially in males. Infection essentially ends a dog's reproductive career. Antimicrobial treatment generally is unsuccessful and no vaccine is available. The potential for rapid spread among susceptible dogs is great, especially in kennels with many closely confined dogs.

None of the diagnostic procedures commonly used are, in themselves, adequate to permit a definitive diagnosis in all cases. Diagnosis is simplified when several animals in a kennel are infected; however, individual cases pose a variety of problems. Regard serology as presumptive, attempt blood cultures, review history, and perform follow-up serology.

- Blood culture is the most sensitive and reliable diagnostic test during the first two months of infection (serological tests vary markedly during this period).
- All serological tests are diagnostically significant from the onset of bacteremia until six or more months after the bacteremia has subsided (27-to-64 months), or has become intermittent.
- Agglutination and AGID tests using cell wall extract become progressively uncertain when infected dogs become abacteremic (as early as six months but generally after 1 year).
- AGID tests using cytoplasmic antigen become positive two months after the onset of bacteremia and appear to have the advantage of detecting infected animals for up to 12 months following cessation of bacteremia.

The agglutination test is the most widely used serological test. Nonspecific agglutination reactions can occur, hemoglobin causes false-positives and cross-reactions with several bacterial species are a weakness of serodiagnosis. Serologic tests often are negative during the first four weeks of infection. Because of this, test twice at 30-day intervals if the history is suggestive of possible exposure to *B. canis*. Antibiotic therapy may contribute to false-negatives and may result in failure to isolate the organism from infected dogs.

We perform the tube agglutination test (TAT) as does the Colorado Brucellosis Laboratory. Equivocal titers may be detected in chronically infected animals and titers may not be detectable until 3-8 weeks post-infection. A 1:50 titer may indicate very early or recovering infection; a titer of 1:50 to 1:100 is considered suspicious for infection; and a titer >1:100 is highly presumptive of active infection. The TAT is most useful in control programs to quantitate serologic responses of dogs over months to determine whether infection has been eliminated and to evaluate effects of treatment. Depending on the prevalence of infection, the predictive value of a negative test is 98-99% and the predictive value of a positive test is about 75%.

B. canis infection is a zoonotic disease, although transmissibility and virulence for humans appears to be low. The disease in humans (unlike dogs) responds readily to antibiotic therapy. Inform clients of the potential health hazard in keeping *B. canis*-infected pets. Use good hygiene when examining suspected dogs, especially aborting bitches. Use caution when handling samples collected for diagnostic testing.

Brucella canis TAT: Submit 0.5-1.0 ml sera, allow 48 hours for test completion. Fee--$7. Call for special arrangements.

COLORADO HEARTWORM SURVEY

John Cheney and Glenda Taton-Allen

In 1990, we conducted a survey to determine the prevalence of circulating heartworm antigen in 1,010 dogs in Northeastern Colorado. The estimated prevalence was 0.3%.

In 1996, we conducted a larger survey to determine if the prevalence of canine heartworm had changed. We tested 2,500 dogs using the DiroCHEK Canine Heartworm Antigen test kit. The blood samples used had been submitted to the Clinical Pathology Laboratory for serum chemistry profile determinations. The criteria used to select the sample were: dogs over one-year old, owners with addresses from the Front Range in Colorado and Southern Wyoming, and no dogs had been tested positive for heartworm. No effort was made to

check travel history or if the dogs were on prophylactic medication.

Fourteen of the 2,500 dogs tested positive for canine heartworm antigens. Eight dogs had travel histories outside Colorado and were eliminated from the survey. Two dogs had not left Colorado and had been treated for heartworm. The remaining three dogs were tested using three different commercial heartworm antigen test kits and re-tested with the DiroCHEK antigen test. A Knotts test also was performed. The canine antigen tests using the four commercial tests were negative in two of the three dogs. One of the three dogs was positive with all four heartworm antigen test kits. All three dogs tested Knotts negative. Thoracic radiographs in all three dogs were normal.

Results of this 1996 survey showed three positive heartworm cases out of 2,500 dogs tested. This indicates that heartworm has not increased along the Front Range of Colorado since the 1990 survey.

DIAGNOSIS OF FELINE HERPESVIRUS GETS BETTER

Jim Collins and Anita Schiebel

We now offer detection of feline herpesvirus (FHV) by application of a PCR (polymerase chain reaction) test to conjunctival swabs. PCR has proven very sensitive and does not falsely react with other herpesviruses or with other feline viruses. Of 175 cases of suspected cases of FHV conjunctivitis, we found virus in 14 by the PCR test, but only in 6 by virus isolation. The fluorescent antibody test was less sensitive by comparison, and reacted falsely in a significant number of cases. We confirmed the positive PCR cases by either repeat testing, evidence that there was an outbreak in other cats, or by molecular hybridization of the PCR product. The overall prevalence of FHV detected with the PCR test was 12%. The PCR test has detected all FHV isolated over an 8-year period, over 40 isolates. The test also works well on nasal or nasopharyngeal swabs in cases of rhinitis.

To obtain a specimen for PCR FHV testing, expose the palpebral conjunctiva and gently rub or roll a dacron swab across the conjunctival cell layer allowing lacrimal secretions to be absorbed by the swab at the same time. Immediately place the swab in PCR transport media and break the shaft off leaving the swab in the media. Ship the transport media with swab on a "cold pack" by express mail or transport services to us.

PCR of Feline Herpes

Materials for specimen collection are available from us at no charge, we provided the test. We will supply dacron swabs, PCR transport media in sealable plastic bags, and a postage-paid mailing label for your convenience. Multiple swabs (up to three) can be added to a single transport tube for suspected outbreaks of FHV.

FHV PCR: Submit swab as described above. Fee--$21. Combined FHV PCR and virus isolation for other viruses--$28.

EQUINE RESPIRATORY VIRUSES: Rapid Turnaround

Jim Collins

We now offer rapid testing for equine influenza and equine herpesvirus (EHV) types 1 and 4 in nasal swab specimens. Recently, developments with polymerase chain reaction (PCR) technology has enabled us to apply this to the detection of the herpesvirus genes in nasal swabs. For equine influenza, we continue to use the Directigen ELISA for influenza diagnosis. All of these tests are rapid and are performed and completed on the day following receipt of the specimens. Comparison of detection of herpesviruses using PCR and virus isolation (VI) shows that PCR is more sensitive, detecting less than 1 infectious unit. Comparison of Directigen to VI for influenza is underway. One advantage of the PCR test for EHV is that it distinguishes between types 1 and 4 immediately. Whether you have the abortigenic strain, EHV-1, or the predominantly respiratory strain, EHV-4, is known immediately. The same rapid testing for EHV-1 in aborted foals also is performed. Submit nasal swabs for these tests in transport media that we provide.

EHV PCR: Submit swab as described above. Fee--$21 (with Influenza ELISA--$28).

NEW SYSTEM FOR ANTIMICROBIAL SUSCEPTIBILITY TESTING--The bacteriology section is implementing a new computerized system for antimicrobial susceptibility testing effective mid-April. This system allows flexibility in antimicrobial susceptibility testing, and allows analysis of antimicrobial susceptibility trends and compilation

of bacterial isolates. Six panels of antimicrobial agents (representing clinically relevant classes of antimicrobial agents) have been selected for testing bacterial isolates from bovine, canine/feline, equine, porcine, avian/fish, and mastitis specimens. Results will be indicated by S, R, or I to indicate susceptibility, resistance, or intermediate susceptibility to the antimicrobial tested.

SEEKING INFORMATION--We have seen a number of cases of Malignant Catarrhal Fever (MCF) in bison recently. If you have seen any cases, please give us a call as we are gathering information about this disease. Contact Pat Schultheiss or leave us a message.

What's Inside This Issue of LabLines

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