Colorado State University Veterinary Diagnostic Laboratories

LABLINES

Volume 10, Number 1 **Spring 2005**

Letter from the Director

Summer is already here, we missed Spring! One day it was snow, now we are in beautiful Colorado summer weather! As always, there seems to be many new things and constant change in the laboratory. See inside for updates on diseases and disease testing programs. We are continuing our work with the United States Department of Agriculture and the Colorado Department of Agriculture as a member of the National Animal Health Laboratory Network. As such, we are continuing our surveillance efforts for Exotic Newcastle Disease, Highly Pathogenic Avian Influenza, and Transmissible Spongiforim Encephalopathies (Chronic Wasting Disease, Bovine Spongiform Encephalopathy and Scrapie). We are ready to take on the challenge of new disease surveillance efforts. As always, we continue to strive for excellence in all services we provide. To that effect, in January, we met with our external advisory committee to provide us with feedback on how we were meeting our mission and service commitments. We received very favorable comments and are working on areas where improvement is needed. The list of our external advisory members is inside and we greatly appreciate and value their guidance.

Our inadequate facilities continue to cause us difficulties. We are attempting to alleviate some of these difficulties by expanding into more modular units. At this point, the possibility of any new building for us in the near future does not look promising, but we will continue to explore all possibilities of funding. For members of the Colorado Veterinary Medical Association, it was great seeing you at the winter and spring leadership conferences. Although I am no longer president of CVMA, I will continue to be active with our state organization, and so look forward to seeing you in Keystone in September. On the national level, we'll be seeing some of you in July at the American Veterinary Medical Association Convention and in November at the American Association of Veterinary Laboratory Diagnosticians Annual Meeting.

Barbara E. Powers

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EXTERNAL ADVISORY COMMITTEE

Every year in January at CSU's Annual Conference, we meet with our External Advisory Committee. We are grateful to these individuals who donate their time and give their expert advice to us at this meeting and throughout the year. This group helps direct and guide our future development. If you have any comments you would like to make, please contact them (or us directly!).

Dr. Joan Bowen/Small Ruminants	5036 ECR 60	Wellington, CO 80549
Mr. Norm Brown/Equine	8167 NCR 11	Wellington, CO 80549
Dr. Meg Cattell/Dairy	Diary Research & Technology	Fort Collins, CO 80528
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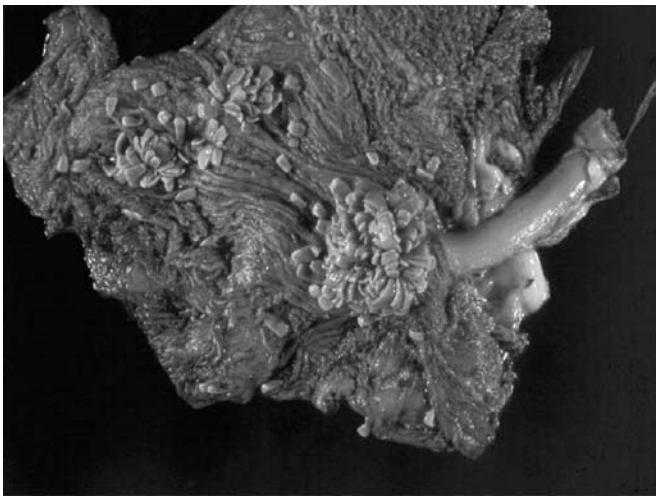
Dr. Mike Miller/CO Div of Wildlife	317 W. Prospect	Fort Collins, CO 80526
Dr. John Scanga/Coop Extension	Animal Sciences Dept/CSU	Fort Collins, CO 80523
Dr. Todd Towell/CVMA Small Animal	1452 Northridge Drive	Erie, CO 80516
Dr. T.P. Welsh/Small Animal	1336 W. Elizabeth	Fort Collins, CO 80521
Dr. Brian Wooming/Poultry	16634 WCR 33	Platteville, CO 80651

TAPEWORMS IN HORSES

—John Cheney and Glenda Taton-Allen

Three species of tapeworms are found in the horse – *Anoplocephala magma*, *A. perfoliata* and *Anoplocephaloides mammillana*. Adult *A. magna* and *A. mammillana* attach to the intestinal mucosa in the small intestine and *A. perfoliata* tends to cluster around the ileocecal valve. Grazing horses become infected by the ingestion of pasture-dwelling orbatid mites containing infective cystiercoid larvae. The prepatent period is 8 to 10 weeks for adult worms to develop.

At one time, tapeworm infections in horses were considered to be non-pathogenic. More recently, *A. perfoliata*, the most common of the equine tapeworms, has been associated with cecal rupture, intussusception at the ileocecal valve, and decreased ileocecal valve distensibility interfering with the passage of ingesta. Heavy infections of this tapeworm are associated with mucosal ulcerations, submucosal edema and hypertrophy of the distal ilium.



Tapeworm infections are difficult to diagnose with traditional fecal examinations designed to detect the eggs of most internal parasites in horses. Only about 3% of tapeworm infections are diagnosed using these fecal examination methods. The centrifugation/flotation technique enhances the accuracy of detecting horse tapeworm eggs, but still is only 61% accurate. Our parasitology

laboratory tested 210 equine fecal samples in 2004 and only one sample was positive for tapeworm eggs. More recently, Craig Reinemeyer, at the East Tennessee Research Laboratory, has developed an ELISA test to measure antibodies to *A. perfoliata*.

A prevalence survey of antibodies to *A. perfoliata* in horses in the United States was conducted in 2003. The lower 48 states were divided into 10 regions. The regional prevalence ranged from 12.7% along the Pacific Coast to 95.8% in the upper midwest, and was greater than 30% in eight out of the 10 regions. In Colorado, the prevalence was about 15%.

Anthelmintics routinely used to de-worm horses are the avermectins and benzimidazoles. These drugs are not effective against equine tapeworms. The only equine wormer licensed in the United States reported to be effective in treating tapeworms is Pyrantel Pamoate given once orally at twice the labeled dose. In our experience, some horses with colic at the time of treatment will appear normal for several weeks following treatment, only to have the colic return. Because of this, we have for some time recommended Praziquantel to treat tapeworms in horses. This anticestode drug is used to treat tapeworm infections in small animals and man. It has a wide margin of safety and is highly effective for treatment of tapeworm infections. More recently, Praziquantel has been combined with several of the avermectins used to control equine internal parasites.

Fecal exam for equines--Submit fresh feces. Fee=$16.

CANINE DISTEMPER EPIZOOTIC CONTINUES

—Hana Van Campen

Canine distemper is making an early appearance in Colorado's wildlife indicating a continued epizootic of the disease. As of February 24, 2005, we have diagnosed canine distemper virus (CDV) in seven raccoons and one coyote from Colorado. The appearance of CDV in wildlife is often a harbinger of the disease in domestic dogs. Last year, CDV cases were diagnosed in domestic dogs and raccoons from Colorado in March and April. These cases were followed by an epizootic of canine distemper in several communities throughout the state that lasted until mid-November. Overall, we received an increased number of samples submitted for CDV diagnosis and reported more CDV FA and PCR test-positive cases in 2004 compared to 2003.

CDV Positive Cases/Total Cases Submitted for FA or PCR Testing

	1/1-12/31/03 + cases/total submitted	1/1-12/31/04 + cases/total submitted	1/1-2/24/05 + cases/total submitted
CDV FA+	2/4 (50.0%)	25/59 (42.4%)	8/17 (47.1%)
CDV PCR+	33/141 (23.4%)	68/260 (26.2%)	14/37 (37.8%)
TOTAL	35/145 (24.1%)	93/319 (29.2%)	22/54 (40.7%)

CDV Positive Cases from Colorado*

	1/1-12/31/03	1/1-12/31/04	1/1-2/24/05
CDV FA+	2	13	8
CDV PCR+	5	15	1
TOTAL	7	28	9

*Samples for which a CO location for the animal was specified on the accession form.

In addition to Colorado, CDV cases appeared in Chicago, IL (JAVMA, Nov 1, 2004), and CDV positive cases were submitted to us from New Mexico, Nebraska, Kansas, Indiana, Texas, New York and Florida.

Canine distemper virus is highly contagious. The virus is transmitted by direct contact with and in the aerosolized respiratory secretions, feces, vomit and urine of infected animals. Veterinarians should update clients on the status of their dogs' vaccinations and encourage vaccination of dogs within their communities. Veterinarians should be on the lookout for situations where infected animals may be imported into Colorado and be ready to advise pet stores and humane shelters on the control of the disease. In addition to raccoons, a wide range of wild carnivores including foxes, ferrets, skunks, badgers and large felids are susceptible to CDV infection. Public awareness regarding the appearance of this disease in wildlife should be made.

CDV PCR testing--Submit fresh lung or brain, CSF, or EDTA blood. Fee: PCR=$30. FA--Submit fresh lung. Fee: FA=$6.

*****NOTICE*****

FHV and FCV testing--Due to increased requests for FHV and FCV serologies to be run separately rather than together, there will no longer be a discounted single charge if both FHV and FCV are requested. The charge for **each** of these tests is now $12 (ie., if either FHV or FCV is requested, the charge will be $12, and if both are requested, the charge will be $24).

E. coli TYPHLOCOLITIS IN A MARE

—Davis Seelig and Karamjeet Pandher

A 6-year-old, 7-month pregnant mare presented to the Veterinary Teaching Hospital at Colorado State University for evaluation of acute colic. Upon presentation, the mare was down in the trailer, exhibiting nystagmus with a heart rate of greater than 100 beats per minute and pale mucus membranes. She died shortly after arrival. There were no previous known medical problems. The previous day, the mare was vaccinated for equine herpesvirus-1 and shortly afterwards began trembling and developed an elevated heart rate. The morning of presentation, the mare was reported to be dull, trembling and weak.

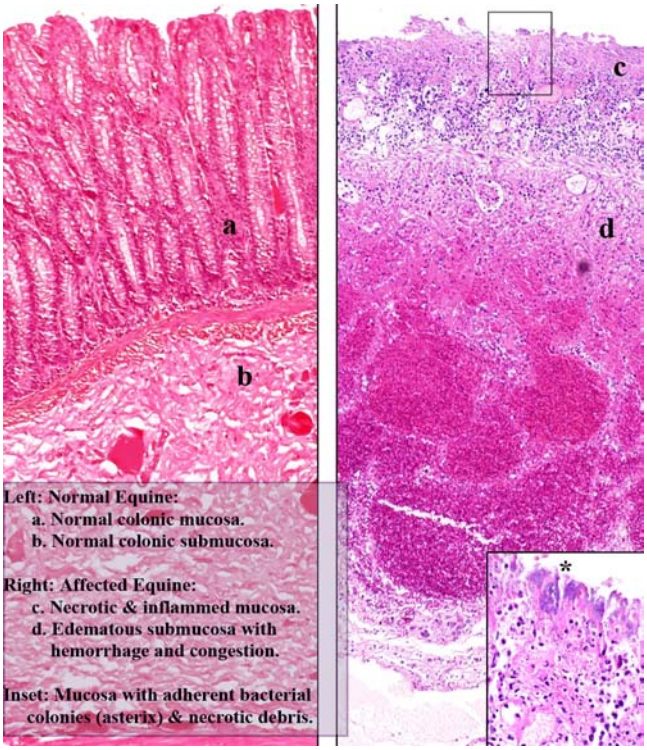
At necropsy, the large colon and cecum were distended with a dark red, watery, turbid fluid. In these organs, the mucosal surface was diffusely discolored dark purple to black, dry and friable, with multiple areas of ulceration and erosion. There was extensive expansion of the underlying submucosa by edema. There were petechial (pinpoint) and ecchymotic hemorrhages disseminated over the surfaces of the subcutis, fascia, pulmonary pleura and epicardium. Based upon these findings, a provisional diagnosis of a necrotizing and hemorrhagic typhlocolitis with a secondary, fatal septicemia and/or bacteremia was made. Tissues were submitted for aerobic and anaerobic bacterial culture, with an emphasis on salmonella, as well as for microscopic evaluation.

As was the case with the gross examination, the most significant microscopic disease was present in the cecum and large colon. In these tissue sections, there were numerous, regionally extensive areas of near full-thickness necrosis with flooding of the tissue by many mixed inflammatory cells, mostly neutrophils. The surface of the remnant intestinal mucosa was covered by large numbers of a single population of small coccobacilli. Additionally, there was necrosis and thrombosis of many vessel walls, many small areas of hemorrhage, and extensive necrosis of lymphoid tissue (interpreted as secondary changes).

Bacterial culture of samples from the colon and large intestine revealed, in addition to a mixed population of normal intestinal flora, a heavy growth of a hemolytic strain of *Escherichia coli*. To further investigate this species, pure cultures of the *E. coli* were submitted to the *E. coli* Reference Center (ECRC) located in Pennsylvania State University's Gastroenteric Disease Center.

Results from the ECRC revealed that this particular *E. coli* strain possessed the gene responsible for the toxin known as Cytotoxic Necrotizing Factor 1 (CNF1). Although this gene can be found in the resident *E. coli* strains of healthy individuals, it usually is associated with intestinal and extra-intestinal infections of humans and animals. Experimental work has demonstrated that this toxic factor is capable of inducing cell necrosis and is able to generate a dramatic pro-inflammatory cytokine cascade. Clinical disease with similar, CNF1-containing *E. coli* strains

has been reported in humans, as well as in multiple domestic animal species, including the cow, dog, ferret and mink.



In adult animals, *E. coli* is a normal inhabitant of the large intestine of most domestic species. Its ability to produce disease is based upon the relative susceptibility of the host and the specific toxic factors of individual strains of bacteria. In the horse, clinically significant disease associated with *E. coli* is most commonly identified in foals. Such infections typically result in neonatal septicemia.

In this mare, the inciting events leading to the fatal colitis are uncertain, but the physiologic stresses of pregnancy coupled with the stress of vaccination may have played a role. The ultimate cause of death was likely due to a fatal septicemia, which was the result of a loss of intestinal integrity due to the proposed *E. coli*-induced necrotizing typhlocolitis, thus allowing bacteria and their products to enter the bloodstream.

This report suggests that various enteropathogenic strains of *E. coli* could be of pathologic significance in adult horses, even though *E. coli*-related disease is generally associated with neonates and juveniles. This underscores the importance of necropsy and bacteriology in cases of equine large intestinal disease.

UPDATE ON TESTING FOR TRANSMISSIBLE SPONGIFORM ENCEPHALOPATHIES (TSE)

--Barb Powers

This has been a very busy year for TSE testing. We are one of seven laboratories across the country testing for Bovine Spongiform Encephalopathy, or "mad cow disease." As of June 2, we have completed over 100,000 tests, while the entire enhanced BSE surveillance system has completed over 380,000 tests. There have been no confirmed positives. The enhanced BSE surveillance program is expected to be scaled down to a maintenance level.

Unfortunately, the same cannot be said for Chronic Wasting Disease (CWD). We have identified two new farmed elk herds with positive cases. These herds have been quarantined by the State Veterinarian's Office, pending development of a herd management plan. In the wild, since July 1, 2004, we have tested approximately 14,500 hunter-harvested deer and elk, including culls and road kills, submitted by the Colorado Division of Wildlife or veterinarians participating in CVMA's Hunter Assistance Program. Slightly over 200 of these have tested positive. Visit the website for the Division of Wildlife for details of distribution of positive cases at www.wildlife.state.co.us. Also, unfortunately, New York has been added to the ranks of states with CWD, both in captive herds, as well as in the wild.

Scrapie surveillance testing through USDA's program also continues with testing by Immunohistochemistry. Since July 1, 2004, we have completed approximately 8,000 of these tests. USDA will change this program to testing by ELISA, as is done for BSE and wild deer and elk.

A SPECIAL THANK YOU **to the COLORADO WILDLIFE FEDERATION (CWF) for their support of our on-going efforts in our studies of Chronic Wasting Disease (CWD). Visit them at www.coloradowildlife.org.**

WESTERN SLOPE NEWS

Darrel Schweitzer is retiring!

After 27 years of service to Colorado State University, Dr. Darrell Schweitzer, the Director of the laboratory at Grand Junction, will be retiring. He has provided years of quality service to the region and has received awards for service from the Wool Growers Association. We will have a party in his honor on June 25th at 1PM at the Devil's Kitchen picnic area. You are welcome to attend and bid your farewells. We wish Darrel all the best in his new adventures.

Long-time employee John Rhodes also retired from the Grand Junction laboratory. John has also provided excellent service to the region for many years. We welcome a new employee, Kim Bob Hannafious, who will take over John's duties. We will soon begin the search for a new director for the Grand Junction laboratory and will try to not have too much disruption of service in the transition period. Please call Barb Powers at 970-297-1281 is you have questions, or would like to assist us in the transition period.

HIGHLY PATHOGENIC H5N1 AVIAN INFLUENZA

—Kristy Pabilonia and Hana Van Campen

A highly pathogenic strain of avian influenza virus of the H5N1 subtype has spread to poultry in several East Asian countries including China, Vietnam and Thailand. The unusual characteristic of this "avian flu" virus is that it has the ability to infect people. To date, there are 100 confirmed cases with 54 deaths. More than 200 million birds have been depopulated or have died due to infection.

Influenza A viruses replicate primarily in the gastrointestinal tract of birds and are shed in large quantities in feces. Mutations of the viral genes can result in conversion to virulence. These virulent avian influenza viruses are capable of spreading systemically within infected fowl. Infection of chickens with virulent flu viruses leads to edema of the comb and head, hemorrhages visible on the comb and feet, diarrhea, depression and peracute death. In contrast to the infection in birds, Influenza A viruses cause respiratory infections in humans.

This avian flu virus first appeared in Hong Kong in 1997. Previously, it was largely believed that new strains of Influenza A viruses had to infect swine as an intermediate host in order to acquire viral genes that allow these viruses to infect mammals. The 1997 cases in Hong Kong indicated that some avian flu viruses could infect humans directly. In this initial outbreak, 18 people were infected and six died. In humans, the H5N1 virus causes fever and a viral pneumonia. Infection apparently occurs by direct contact with infected poultry or their feces. Evidence from a recent case indicates that this virus may be transmitted from person-to-person, increasing concern about the global spread and pandemic potential of the H5N1 virus.

Colorado has an active surveillance program designed to detect Avian Influenza if it occurs in this state. This program is a cooperative effort between us, the Colorado Department of Agriculture, Colorado Department of Public Health and Environment, and the United States Department of Agriculture through the National Animal Health Laboratory Network. This surveillance is of extreme importance to detect cases early so control programs can be implemented to prevent spread of disease and economic losses.

HPAI Surveillance--Submit tracheal or cloacal swab. Fee=$0.00

BVD QUESTIONNAIRE RESULTS

—James Kennedy/Rocky Ford

In March 2004, the Colorado State University Veterinary Diagnostic Laboratory (CSU-VDL) and the Colorado Department of Agriculture (CDA) jointly initiated a voluntary BVDV control program. Part of the program included a 20-question form for participants to complete and submit. The objectives of the questionnaire were threefold – 1/To challenge the producer to critique their management practices, 2/To provide veterinarians with areas where they might help their clients improve, and 3/To assess the risk that BVDV existed within the producer's operation. After one year, the results of the questionnaire have been tabulated and are provided below. Not all producers completing forms followed through with diagnostic testing. Of those who did, no herds were found to contain persistently infected animals. At this point, no conclusions can be drawn to suggest that how a producer answers a question gives an indication of whether or not a BVDV PI exists in the owner's herd. However, practitioners should be able to use the information to identify areas where they might assist their clients more effectively. Improving a client's productivity can lead to a positive return for the veterinarian. Providing a structured consulting program can provide education for the client and, again, a positive return for the veterinarian. The questionnaire also indicated 20% of producers were not pregnancy testing their animals. We know this testing shows a return on investment based on lost production and feed costs. When you couple the pregnancy evaluation with a record system that allows the veterinarian to analyze reproductive performance, these procedures can be used as integral parts of a herd health program. I would encourage the veterinarian to look at the questions and replies, keeping in mind potential opportunities to help their clients while improving their practice.

Some final numbers concerning BVDV diagnoses over the past year are as follows. The Rocky Ford Laboratory tested 3,529 ear notches and identified 24 animals as PIs (0.68%) (none of the test-positive animals were from herds enrolled in the program). FA studies conducted at the Rocky Ford Laboratory on 105 non-related cases identified 15 animals that were diagnosed with BVDV (14.3%), as compared to 5% for IBR, 10% for BRSV, and 3% for PI-3. These figures stress the impact BVDV has on our cattle industry and why veterinarians need to become actively involved in the voluntary BVDV control program.

Questionnaire Results

	Yes %	No %
Do you regularly consult with your veterinarian?	89.50	10.50
Do you pregnancy check your cows?	78.90	21.10
Was last years pregnancy rate greater than 90%?	100.00	0.00
Was last years weaning rate greater than 90%?	94.70	5.30
Did less than 5% of your calves die after weaning?	89.50	10.50
Do you at least once each year vaccinate your cattle for BVDV?	94.70	5.30
Do you record the brand, lot number, and expiration date of the vaccines you use?	78.90	21.10
Do you submit aborted fetuses for diagnostic work-up to your veterinarian?	73.70	26.30
Has your veterinarian ever diagnosed BVDV in your cattle?	68.40	31.60
Do you routinely isolate all new additions for at least 21 days?	42.10	57.90
Do you routinely have all new additions to your herd tested for BVDV	68.40	31.60
Over the past 3 years, has your calving rate always been above 90%?	89.50	10.50

Did greater than 95% of your cows calve within 90 days last year?	94.70	5.30
Do you see wildlife grazing with your cattle less than three times per month?	78.90	21.10
Do you spend less than $5. per animal per year to treat illness?	78.90	21.10
Has your veterinarian informed you of the different types of BVDV virus?	78.90	21.10
Did you treat less than 10% of last years calf crop for respiratory disease?	89.50	10.50
Did you treat less than 10% of last years calf crop for GI disease?	89.50	10.50
Do you maintain production records that individually identify each animal?	89.50	10.50
Do you monitor weaning weights of each years calf crop?	100.00	0.00

HEALTH IMPACTS FROM CATTLE PERSISTENTLY INFECTED WITH BVD IN FEEDLOTS

—Gary Mason

In the preceding article, Jim Kennedy describes the voluntary Bovine Viral Diarrhea (BVD) control program he initiated along the with the Colorado Department of Agriculture. Although no persistently infected (PI) animals were identified in herds enrolled to date, he shows data from accessions that indicate BVDV remains one of the most common viral pathogens of cattle.

A recently published study (Lonergan, GH, et al., Prevalence, outcome, and animal-health consequences of feedlot cattle persistently infected with bovine viral diarrhea virus. JAVMA 2005, 226:595-601), conducted, in part at the CSU-VDL, underscores the potential for economic loss in fed cattle due to the presence of persistently infected animals. The goals of the study were to estimate the prevalence of animals persistently infected with bovine viral diarrhea virus at feedlot arrival, estimate the prevalence of chronically ill and dead animals persistently infected with BVDV, and estimate the magnitude of excess disease attributable to the presence of a PI animal. Persistently infected cattle were identified by immunohistochemical examination of ear notches from three groups of feedlot animals: a group of 2,000 head were sampled at arrival; 1383 chronically ill animals derived from seven feedlots; and 1585 dead animals from a single feedlot. The 2000 animals from which samples were collected at arrival were followed and animal health outcomes were determined for animals exposed and unexposed to a PI animal. Of the three groups of animals evaluated, the prevalence of animals PI with BVDV was 0.3% at arrival, 2.6% in chronically ill cattle and 2.5% in dead cattle. The risk of initial treatment for respiratory disease was 43% greater in animals exposed to a PI animal compared to those unexposed to a PI animal. Overall, 15.9% of initial respiratory disease events were found to be attributable to exposure to a PI animal.

This study showed that relatively few PI animals arrive at feedlots; however, these animals are more likely to require treatment for respiratory disease and either become chronically ill or die than animals not PI. In addition, the presence of PI individuals is associated with an increase in the incidence of respiratory disease of in-contact animals. While it remains unclear whether or not assessment of BVDV states at the time of processing makes economic sense for feedlots, there may well come a time when backgrounding operations can gain an advantage by marketing groups of calves known to be free of PI animals.

PROPER HANDLING OF EAR NOTCH SAMPLES FOR THE DETECTION OF BVDV BY ANTIGEN-CAPTURE ELISA

—Aya Ushijima and Susan Cleveland

Bovine Viral Diarrhea Virus (BVDV) is transmitted horizontally by the oral-nasal route and vertically from the cow to her fetus. Infection with BVDV can result

in decreased milk production, infertility, abortion, stillbirth and death due to secondary infections. Fetal infection with BVDV also can result in the birth of persistently infected (PI) calves. These PI animals are chronic shedders of the virus and the primary source of BVDV infection. Because PI animals can look like normal uninfected cattle, they can be difficult to identify for removal from a herd.

To identify PI cattle, ear notch samples may be submitted to us for BVDV testing by an antigen-capture (AC)-ELISA. Ear notches are easy and fast to collect and contain minimal blood, preventing interference with the test by maternal antibodies. Ideally, ear notches should be submitted in individually labeled tubes containing 1 to 2 ml of sterile phosphate buffered saline (PBS) within 24 hours of collection. In the real world, there may be delays of days to weeks before samples can be submitted. Veterinarians may not have a handy supply of sterile PBS or may inadvertently add large volumes (up to 10 ml) of saline. There has been no research published indicating how these and other accidental factors affect the accuracy of the AC-ELISA used to identify BVDV.

To determine the effect of different conditions on the accuracy of this test, ear notches from known PI cattle were exposed to the following treatments and analyzed by AC-ELISA. We identified the following conditions that **negatively** affect the accuracy of AC-ELISA test results:

- Dehydration of ear notch by leaving it to dry on the dashboard of a vehicle
- Coating the ear notch with impurities such as manure
- Soaking the ear notch in more than 5 ml of PBS
- Soaking the ear notch in ethanol or 10% buffered formalin

Factors that did not affect the test result of a known PI animal were freezing and thawing the sample, using ear notches smaller than the recommended size (1x1cm), or soaking ear notches in water, Hanks balanced salt solution, sterile normal saline, or lactated Ringer's solution. The effect of sterilizing ear notchers with Nolvasan was simulated by dipping ear notches in a diluted solution of Nolvasan prior to soaking the samples in PBS for 10 minutes. Nolvasan did not appear to have an adverse effect on the test results.

To ensure proper test results, the best method for submitting ear notch samples to us is to place each sample in a red top tube or snap cap tube containing 2 ml PBS. Samples should be frozen or refrigerated until shipped. Place samples with chillpacks and with sufficient packing to prevent breakage. Ship to us by overnight mail, FedEx or UPS. Test results are available within 24 hours of submission. If you have questions regarding ear notch sample submissions or proper handling, please contact us at 970-297-1281.

Ear Notch BVD Testing/ELISA--Submit as described above. Fee=$7 (1-10), $5 (11-50), $4 (>50). IHC--Submit in 10% buffered formalin. Fee=$20 (6 samples).

GASTRIC ADENOCARCINOMA IN TWO RELATED PERSIAN CATS

—Michelle Dennis/EJ Ehrhart

Two related, adult, male, Persian cats from the same household were concurrently diagnosed with gastric adenocarcinoma. Additionally, the fundic gastric mucosa of both cats was diffusely affected with severe proliferative and fibrosing gastritis. Intralesional adult *Ollulanus tricuspis* nematodes and rare surface-associated, spiral-shaped bacteria were identified in one cat.

The second cat was treated with an anthelmintic prior to tests for *Ollulanus tricuspis*. Clinical signs in each cat had commenced two months apart and included vomiting, hematemesis, intermittent melena and weight loss. This is the first report of gastric adenocarcinoma occurring in housemate cats, or cats of common descent. Carcinogenesis may have been influenced by shared undetermined genetic and environmental factors, possibly including *Ollulanus tricuspis*, spiral-shaped bacteria, or some other unidentified etiology for chronic gastritis.

UPDATE ON IBR VIRUSES ISOLATED FROM COLORADO FEEDLOTS

—Hana Van Campen

Infectious bovine rhinotracheitis (IBR) virus, also known as bovine herpesvirus-1 (BHV-1), was isolated from several cases of bovine respiratory disease in Colorado feedlot calves from fall 2003 to spring 2004 (see Spring 2004 issue of LabLines). One of the IBR

isolates was analyzed by Dr. Robert Fulton at the Oklahoma State University. Serum samples from vaccinated calves were tested for antibodies to the IBR viruses found in vaccines and to the recent IBR isolate. Dr. Fulton found that vaccinated calves had a lower concentration of antibodies that would neutralize the recent IBR virus compared to the vaccine viruses. His results suggest that there are significant antigenic differences between IBR viruses currently circulating in feedlots and the IBR viruses used in bovine viral vaccines.

Four of the five bovine viral vaccines examined by Dr. Fulton contain the Colorado 1 NVSL strain of IBR. The name of this virus is not just coincidental as there is a long association of this herpesvirus infection with Colorado cattle. The original Colorado 1 IBR virus was obtained from the lung of a calf that was necropsied by Dr. Larry Mackey's father, Dr. Donald Mackey, in 1956. Dr. Mackey submitted the tissues to Iowa Veterinary Services Laboratory (now the National Veterinary Services Laboratory (NVSL)) in Ames, Iowa, where veterinary scientists isolated one of the first IBR viruses from these Colorado calves. The discovery of IBR was quickly followed by research on the epidemiology of IBR by Dr. T.L. Chow in the College of Veterinary Medicine and Biomedical Sciences at CSU. Drs. Chow and Brown also tested two early IBR vaccines for efficacy by experimental challenge and by vaccinating feedlot cattle. Dr. Jim Collins, diagnostic virologist at CSU-VDL from 1983 to 1999, conducted research to develop diagnostic assays for IBR including antigen-capture ELISA and PCR to detect IBR viruses.

As of 2005, we still are receiving cases from the gentleman whose calves yielded the first IBR virus. He still is successfully raising calves in Colorado 50 years after his first experience with "rednose" in calves.

IBR Diagnostics/FA test--Submit fresh tissue. Fee=$5. PCR--Submit fresh tissue. Fee=$25. Virus isolation--Submit fresh tissue. Fee=$25.

LEPTOSPIROSIS SEROLOGY TEST SCHEDULE

—Doreene Hyatt and Cindy Hirota

Due to a reported increase in cases of leptospirosis (especially canine reports), an additional testing day for serology has been added. We currently are testing serum for leptospiral antibodies on Wednesday and we plan to offer an additional testing day on Friday beginning May 1, 2005. As usual, if Brataslava serotype testing is desired, it must be requested on the submission form. Testing on a single day (Wednesday) will resume at the end of the season (end of September) or when sample submission begins to decline.

For your information, the table below gives the number of serum samples tested for titers to *Leptospira interrogans* between January 1 and April 4, 2005, and the entire years for 2003 and 2004 by animal species. Numbers given in parenthesis for the years 2003 and 2004 are the number of submissions between January 1 and April 4.

Species	2005	2004	2003
Bovine	138	231(117)	361(182)
Camelid	0	2(0)	3(0)
Canine	54	181(31)	106(19)
Caprine	0	2	2(1)
Equine	14	34(9)	23(14)
Ovine	2	5(2)	3(3)
Zoological	3	5	7(5)
Porcine	6	0	0
Feline	0	2(1)	0

Lepto serology results for each of the five serotypes for serological samples submitted between January 1 and December 31 in 2004 and between January 1 and April 5, 2005, for ALL animal species is shown in the table below. The total number of samples tested (N) and the number of positive results (P) as defined as a titer greater than or equal to 1:100, as well as the highest titer reported during the year (High) is given.

	2004 N=467		2005 N=211	
	P	High	P	High
L. canicola	49	800	44	800
L. grippo	76	819,200[a]	40	6400
L. hardjo	33	800	45	1600
L. ictero	102	3200	55	1600
L. Pomona	87	102,400[b]	41	6400

[a]Three dogs had titers ≥ 1:102,400 (samples from IL (Cocker Spaniel); CO (Jack Russell Terrier); NY (Eskimo)).

[b]Dog also had titer of 1:102,400 to *L. grippotyphosa* (sample from IL).

Additionally, 18 tests for *L. bratislava* were conducted in 2004 and five were positive with the highest titer being 1:3200. From January 1 to April 5, 2005, 13 samples were tested and one was positive at 1:200.

NAME CHANGE—For those of you who didn't know, *Haemophilus somnus* has had a name change. The new name for *Haemophilus somnus* is *Histophilus somni.* In the last few years, we have changed the names of respiratory pathogens from *Pasteurella haemolytica* to *Mannheimia haemolytica,* and now *Haemophilus somnus* to *Histophilus somni.* What organism will be the next to have a new name? Only the molecular biologists know. . . .If you receive a report with an organism with which you are not familiar (and you don't want to ask us), there is a Web site with a list of bacterial names and their first publications at http://www.bacterio.cict.fr/.

EXOTIC NEWCASTLE DISEASE SURVEILLANCE

--Kristy Pabilonia

From August 2002 to September 2003, California experienced an outbreak of Exotic Newcastle Disease (END). END had not been diagnosed in the United States since 1974. This outbreak had a profound effect on commercial poultry producers, backyard flock owners and pet bird owners. State and federal governments, and animal health organizations worked in conjunction to control and eradicate this outbreak, at a cost of more than $198 million. Additional monetary losses included commercial losses due to depopulation of infected premises, loss of domestic and international trade, and increased costs to consumers of poultry products. More than 3.16 million birds were depopulated, of which 145,000 birds were from backyard flocks.

During this outbreak, cases also were reported in Las Vegas and Arizona, attributable to illegal trafficking of poultry for cock-fighting purposes. Transmission of this virus occurs via direct contact or contact with feces or secretions. Mortality rates can approach 100% in exposed birds. Clinical signs of this disease include nasal discharge, respiratory distress, swelling of the tissues around the head and neck, incoordination, paralysis and peracute death.

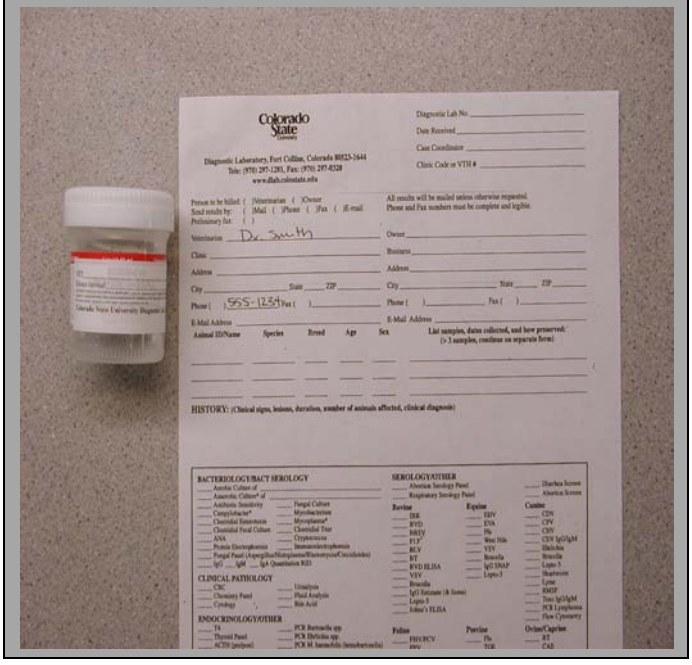
Cases of human infection have been reported. Disease in humans appears to be mild with conjunctivitis and excessive lacrimation constituting the primary clinical signs.

Colorado has an active surveillance program designed to detect END if it occurs in this state. This program is a cooperative effort between us, the Colorado Department of Agriculture and the United States Department of Agriculture through the National Animal Health Laboratory Network. This surveillance is of extreme importance to detect cases early so control programs can be implemented to prevent spread of disease and economic losses.

END Surveillance--Submit tracheal or cloacal swab. Fee=$0.

MISSING IN ACTION--Biopsy Samples

Please, please give us your clinics name, address, phone and fax numbers including an Email address with your biopsy submissions. Also include the owner and patient information, including a complete history and physical findings. As we have changed our method of mailing histo mailers out, we do not provide clinics with pre-addressed mailing labels. This change speeds up our process for sending mailers to the clinics. Unfortunately, in some situations, we receive samples with inadequate information and we cannot process these samples. We do hold these samples hoping for a phone call that will link the clinic and tissue together again. We look forward to seeing fewer and fewer MIA's.



WHAT'S IN THIS ISSUE OF LABLINES

- Tapeworms in Horses
- Canine Distemper Epizootic
- *E. coli* Typhlocolitis in a Mare
- Update on TSE
- Schweitzer Retiring
- Avian Influenza
- BVD Questionnaire Results
- Cattle Infected with BVD in Feedlots
- Ear Notch Samples for BVDV
- Gastric Adenocarcinoma in Cats
- IBR Viruses Update
- Leptospirosis Serology Test Schedule
- Exotic Newcastle Disease Surveillance

STATE/NATIONAL MEETINGS AND HOLIDAY CLOSURES

Meetings: July 16-20, AVMA Annual Convention, Minneapolis, MN
September 9-10, CVMA Fall Leadership Conference, Keystone, CO
September 10-14, CVMA Convention 2005, Keystone, CO
November 3-9, AAVLD 48th Annual Convention, Hershey, PA

Laboratory Closures: Independence Day, Monday 7/4/05
Labor Day, Monday 9/5/05
Thanksgiving, Thursday/Friday 11/24-25/05

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