Animal Health Centre
NEWSLETTER

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From The Assistant Chief Veterinarian

R. J. Lewis

Since the last issue of the Diagnostic Diary was forwarded to you, we have received some very good news. The Animal Health Centre has been accredited as a full service diagnostic veterinary laboratory by the American Association of Veterinary Laboratory Diagnosticians (AAVLD). We are only the second laboratory in Canada (the first being the veterinary laboratory at the University of Guelph in Ontario) to have this accreditation. This accreditation results from exhaustive documentation of information and on-site inspection by the AAVLD Accreditation Committee.

Application for certification involved providing information including the size of the facility, types of services offered, numbers of submissions, qualifications of professional and technical staff, data retrieval systems, and other detailed information. The inspection team consisted of the heads of the veterinary diagnostic laboratories at Washington State University, the California Veterinary Diagnostic Laboratory System, and Kansas State University who spent two full days and two nights in Abbotsford. They toured the AHC, interviewed section heads, spoke with technical staff, and reviewed all our internal and external reports. One evening local practitioners were interviewed regarding the quality of services that we provide. In early February we were advised that the AAVLD Executive had approved the AHC as a full service diagnostic laboratory.

Accreditation is valid for five years at which time another on-site review will be necessary to retain this certification. It is gratifying that very well-qualified outside observers have thoroughly reviewed all aspects of our operation and determined that we meet and exceed all quality assurance and quality control standards. Accreditation by the AAVLD will provide our clients with confidence that our results are accurate and determined by well-documented testing procedures. It will also provide us the opportunity to exchange specimens with other AAVLD laboratories to ensure that our testing protocols continue to meet high standards.

TOLL FREE NUMBER: Please note that the Animal Health Centre now has a toll free number: 1-800-661-9903. Keep this in mind if calling the Lab long distance.

Restructuring News

Since the last newsletter the Ministry of Agriculture, Fisheries, and Food has been re-structured leading to many changes. Dr. Peter Hewitt, formerly Chief Veterinarian in charge of the Animal Health Branch, is now the Director of the Animal Industry Branch. The Animal Health program and several livestock commodity teams make up this new Branch. The Chief Veterinarian remains in charge of the Animal Health program including the Animal Health Centre, the Animal Health Management Veterinarians, the Regulatory Team, and the Fish Health Veterinarian. The Brands program remains a part of the Regulatory Team until it is phased out in the fall of 1997. Dr. Mervyn Wetzstein is the Assistant Chief Veterinarian responsible for the Regulatory team and the Animal Health Management Veterinarians. Most changes should be transparent to the users of the Animal Health Centre. Any questions you may have regarding this new structure or other matters relating to Animal Health, please direct them to me and I will do my best to assist.

Electronic Mail Access

Following a request from a veterinary practitioner, we are setting up our reporting system so that laboratory reports may be forwarded electronically. We hope to have this service in place very soon and available to you if you use MS Word for Windows or Word Perfect for Windows. If you wish to receive your laboratory reports via Email, rather than by hard copy or FAX, please telephone and let us know your electronic mail address. We will be pleased to extend this service to you.

Mortality in Porpoises Near Southern Vancouver Island

R. Lewis

Beginning in April and lasting through to the beginning of July of this year, we have had several submissions of porpoises from a research group in Victoria. This group has been monitoring marine mammals for several years and, when mortalities occur, samples are collected and forwarded to us for examination. The samples submitted have been equally distributed between Dall's (7) and Harbour porpoises (6) and the sexes (6 males, 5 females, 2 not indicated) are equally represented. Animals appear to be between 2 - 4 years of age. No clinical signs have been observed and animals have been found beached in varying states of decomposition. A total of 18 animals have been found this year, primarily near Victoria but extending almost as far west as Port Renfrew. In most years, 5 - 6 animals are reported except for a similar 'outbreak' at the same time of year in 1993. As of this writing, no further mortalities have been reported.

Most animals demonstrate evidence of internal parasitism of variable degrees of severity. Such things as parasitic gastritis, parasitic pneumonia, and parasitic hepatitis are fairly consistent but not considered to be the primary cause of death. A few animals have shown other pathological abnormalities but these would

Mortality in Porpoises continued...

appear to be individual, versus population, problems. Unfortunately, entire animals have not been submitted to us and often specimens are fairly decomposed when found. Bacteriology and virology in almost all cases is not appropriate. Samples will be analysed for heavy metals and other possible intoxicants at a later date; analyses in previous years were unrewarding.

Examining samples from marine mammals has provided useful information regarding normal, background, parasitic infections as well as trace mineral, heavy metal, and organochlorine concentrations. In several areas of the world morbillivirus infection has been responsible for large mortalities in various species of porpoises, dolphins, and seals; fortunately, we have not had any indication of infection with this virus in any of our inshore porpoises.

AVIAN NEWS

Avian Influenza in Fraser valley turkeys

Avian influenza virus was recently isolated from a group of 8000 nine week-old Fraser Valley turkeys, in which many birds were displaying a respiratory snick, or sniffles. Thirty-four birds had died overnight, which prompted a submission by the veterinarian for necropsy examination of some of the dead birds.

Necropsy on the birds was similar in all specimens; the most significant findings among the birds were tracheal (windpipe) inflammation, pneumonia, and inflammation of the air sacs. Bacterial cultures yielded *E coli* from most tissues, which is viewed here as an opportunistic pathogen. Bacterial cultures for *Mycoplasma* sp. were negative. A PCR/DNA probe was also done for *Mycoplasma gallisepticum* and *M. synoviae*; these results were also negative. Tissue cultures on specimens taken from affected birds were positive for avian influenza virus; confirmed positive by PCR. Antibody levels for avian influenza virus in blood taken from affected, live, birds, were strongly positive.

Avian influenza is typically an acute, highly fatal disease of chickens, turkeys, pheasants, and certain wild birds. Ducks, geese, and other waterfowl are less susceptible, but do contract the disease at times. Waterfowl such as ducks and geese are actually commonly infected with avian influenza viruses (and also parainfluenza viruses. Infection in these species is intestinal in nature (as opposed to respiratory in domestic fowl), and these birds act as the major inapparent reservoir of the virus. Virus may also be shed in their droppings in large quantities. Avian influenza virus (AIV) tends to cause mild disease in waterfowl, but there have been exceptions such as the Duck/Czech/56 strain, which caused severe mortality in Czechoslovakia.

Avian influenza was suspected on a second Fraser Valley poultry farm at about the same time, where 6 week-old turkeys had displayed signs of respiratory disease. Birds from this second farm were positive for avian influenza on serology,

Avian Influenza continued...

although the virus was never isolated or identified. Following isolation of the virus on the first farm, efforts were undertaken to prevent the spread of the disease to other, nearby poultry operations. At a meeting of the B.C. Turkey Growers Association, Drs. Lewis and Robinson of the AHC informed members that AIV had been isolated from a Fraser Valley turkey farm. They also gave a brief overview of avian influenza virus infections, and the need for strong biosecurity measures during the current outbreak.

The source of the virus infecting the 9 week-old turkeys was not precisely determined. Several hundred birds actually died on this farm; secondary infections with coliforms such as E.coli contributed to the mortality, estimated at 8-9 %. Fortunately, however, at the time of writing, this mini-outbreak of clinical disease has ceased. Biosecurity on the original turkey farm was not overly comprehensive. Contamination of the air intakes from nearby outdoor range flocks of chickens or fancy birds was possible; wild birds may have introduced the virus into the barn. A large flock of Canada geese and some ducks had been seen feeding in a field adjacent to the infected turkey barns.

Another known possible sources of AIV transmission may be poultry manure. Swine can experimentally transmit AIV to domestic fowl, but it is not known if, in fact, this actually happens in nature, as no proven cases of the disease in turkeys or chickens have ever been traced back to swine. The virus may also be introduced mechanically into a poultry farm via boots, truck tires, infected litter, and air currents, etc.

There are two serotypes of AIV that are considered to be extremely dangerous to domestic fowl because of their inherent pathogenecity (ability to cause disease); these are the H5 and H7 serotypes. Whenever AIV is isolated, it is immediately sent to Agriculture Canada's federal laboratory in Nepean, Ontario, for further testing. In the outbreak reported here, the virus was identified as type H6, which is considered to be of low pathogenicity.

Muscle injury in an ostrich

Skeletal myopathy, or skeletal muscle injury and degeneration, was diagnosed in a mature ostrich that had been chronically and intermittently weak for several months.

The bird had been transported to Vancouver Island from California several months earlier, and had required extensive veterinary care upon arrival.

On microscopic examination the muscle lesions appeared chronic in nature, with extensive scar tissue occurring. These muscle injuries may represent a sequel to an initial bout of transport myopathy.

Fatal brain inflammation:

Fatal brain inflammation (meningoencephalitis) was diagnosed in a 2 year-old goat that had died after a brief illness of three days. On post mortem microscopic examination, numerous microabscesses were noted within portions of the animal's brain stem on this animal. The bacterial organism ***Listeria monocytogenes*** was isolated in heavy growth from brain tissue.

L moncytogenes is a bacterial agent commonly associated with brain disease in domestic animals, although it may also produce outbreaks of abortion as well, especially sheep and goats, less commonly in cattle. Single,or at times multiple, abortions in cattle due to *L. monocytogenes* is occasionally diagnosed at the AHC. Aborted fetuses and membranes are heavily contaminated with the organism, and should be incinerated to minimize environmental contamination and exposure of other animals or humans - salvaging some tissues, of course, for laboratory examination.

This organism is widely distributed in nature, and may be isolated from soil, water, or vegetation. It may also be identified in feces and tissues from a wide variety of domestic and wild animal species. In domestic animals, disease caused by the organism is associated with feeding corn silage. Changes in weather, or stressful seasonal variations, may also precipitate clinical disease in one or more animals within a group.

Treatment of listerial brain inflammation in domestic animals is usually unsuccessful, as irreparable brain damage has occurred by the time treatment is initiated. Remember that animals afflicted with this disease display nervous signs that can resemble other conditions, including rabies. Whenever this organism or similar agents affecting the animal's central nervous system are encountered, examination of the animal by a veterinary practitioner is recommended.

Severe anemia in a mature goat:

Severe anemia due to abomasal hemonchosis, or parasitism by the "barber's pole" stomach worm ***Hemonchus contortus***, was diagnosed in a mature Toggenberg male goat. The animal had been lethargic for the previous week or so, and dewormed a couple of months earlier by the owner. The animal did not have diarrhea. This had been the second recent loss of a mature goat in this small goatherd of six animals.

Necropsy revealed a severely anemic animal, with blood approaching the consistency of water. Lungs contained quantities of proteinaceous edema fluid, which filled the lower bronchi and windpipe. Patchy areas of blue discoloration were noted in the lung tissue.The glandular stomach, or abomasum, was filled with numerous tiny blood-sucking worms called *Hemonchus contortus*. No other parasites were detected on gross examination, although a low level of coccidial parasites was observed on fecal flotation. No external parasites were seen.

Microscopic examination of tissues also revealed a mild to moderate, patchy, suppurative bacterial bronchopneumonia, which was a secondary problem arising in this severely anemic and stressed animal.

Severe anemia continued...

The owner was immediately phoned regarding the necropsy results, as in all likelihood other animals in the group were also heavily parasitized. Two items become apparent in this case: the value of range or pasture rotation to reduce the ongoing exposure of domestic stock to internal parasites such as *H. contortus*; and the importance of choosing the correct anthelminthic, or deworming agent. There is little value in deworming animals if the preparation chosen will not control the common or more serious parasites, or if the animals are promptly turned back onto heavily contaminated pasture. Pasture rotation, however modest, should be attempted. Regular, programmed deworming should occur over the year. Periodic monitoring of animal parasite loads by fecal floatation will help to minimize parasite disease problems.

Consult your veterinarian for a deworming program that suits your situation. Remember that medications for coccidiosis, an intestinal protozoal disease, will not treat gastrointestinal disease caused by worms - the reverse is also true.

Erysipelas in feeder pigs:

A 5 month-old feeder pig was submitted to the AHC for necropsy after a three-day illness. The owner lost 3 other animals from the same pen, in much the same fashion. The pigs were described as being normal one day, and acutely ill the next, with death following in 24 - 48 hours. There were 800 animals within the barn.

Gross post mortem findings were unremarkable. “Diamond” skin lesions were not observed on the animal. Lungs were edematous and congested, and microscopically there was a diffuse interstital pulmonary reaction. The causative agent of **swine erysipelas, *Erysipelothrix rhusiopathiae***, was cultured from lung and brain tissues, and from a spinal swab.

These animals had never been vaccinated for erysipelas. A previous case was also diagnosed in a swine herd earlier in the spring, again with no recent history of preventive vaccination. Both of these cases illustrate the value of necropsy examination of unexplained losses in a group of animals, of any species. When a definitive diagnosis is obtained, preventive and therapeutic measures may then be taken for the remaining animals.

There is practical, diagnostic value of sending brain tissue to the laboratory for bacterial culture in suspected cases of porcine erysipelas, especially where antibiotic therapy had been attempted prior to death. Positive bacterial identification of the erysipelas organism in earlier cases has at times only been achieved from cultured brain tissue, while other samples such as joints, lung, spleen, etc., were negative. This may relate to lower antibiotic concentrations within brain, in contrast to other tissues.

Mycobacterium paratuberculosis:

M*ycobacterium paratuberculosis,* the bacterial agent that causes Johne's disease in ruminants, was recently diagnosed as the cause of **infectious abortion** in a Holstein cow. On microscopic examination of fetal tissues, fetal intestinal sections revealed a marked granulomatous inflammatory response, complete with giant cells. These intestinal sections were positive for acid-fast bacteria, using special stains as well as the polymerase chain reaction (PCR) procedure.

This is the first time that this agent has been positively identified as a cause of infectious abortion in any species, at the Animal Health Centre. Since it is likely that the dam of the aborted fetus was carrying the agent within its intestinal tract, a blood serum sample from the aborted cow was requested from the practitioner. Circulating blood serum antibodies for the organism should be detectable, using a highly specific ELISA test. To date however, a blood sample has not been received.

Leukemia:

Leukemia was diagnosed in an eight year-old marmoset from a zoo. The animal died after a period of wasting. On microscopic examination, liver sinusoidal vessels, as well as those of the lung, heart,and brain, were filled with cancerous cells. Actively dividing cells (mitoses) were occasionally seen.

Lead poisoning:

Lead poisoning was diagnosed in a 6 week-old beef calf, one of two animals that had shown nervous signs prior to death. Bits of plastic were observed within the abomasum of the animal by the veterinarian, and on gross post mortem the practitioner noted a distinct petroleum odour in the animal's rumen contents. The veterinarian mentioned that the animals may have had access to stored petroleum waste. Kidney and liver lead levels were 66 and 73 ppm, respectively. These levels are diagnostic for lead toxicity.

Despite the elimination of lead from gasoline products for the last several years, the AHC occasionally diagnoses lead toxicity in domestic livestock. Many of these cases are in cattle, which have chanced upon dumped waste petroleum products or lead batteries, either at pasture or within open storage areas.

Spinal cord infection in a cat:

A young house cat developed a **fatal ascending suppurative infection of the spinal cord**, which began from severe, penetrating, bite wounds about the tailhead. The young, intact, male had been in a fight with another male cat. ***Pasteurella multocida*** was isolated from suppurative exudate in the tail injury. The animal's severe infection was vigorously treated by the practitioner, but too long a time lag had passed prior to the animal's presentation for treatment.

Bovine herpesvirus:

Bovine herpesvirus 1 (IBR) was identified as the cause of abortion in tissues from three separate fetuses submitted for examination. The affected beef herd had suffered several abortions over the previous week.

Microscopic examination of liver and splenic tissue from aborted fetuses revealed multiple areas of tissue necrosis, which are changes characteristic of bovine herpesvirus. Prominent placental inflammation was also present, and occasional placental structures resembling intranuclear inclusion bodies were seen. Electron microscopic examination of aborted fetal tissues, together with tissue cultures, were both positive for bovine herpesvirus.

According to the practitioner, the owner had not vaccinated his cattle for IBR for several years. The practitioner commented that the affected cows passed their placental membranes with ease after abortion.

Heart tumors in dogs:

Heart tumor (atrial hemangiosarcoma) was diagnosed in a middle-aged male dog. The animal's heart sac was distended with large accumulations of blood (hemopericardium); a portion of the bleeding tumor surface was protuding from the right atrium into the pericardial sac. There were no detectable tumors within the spleen, or lung. The spleen is the other organ where primary hemangiosarcomas can be commonly anticipated in dogs (and which may lead to death following surface rupture or injury of the tumor, with secondary intrabadominal bleeding). Since the tumor arises from vascular endothelium, it may actually occur at any site in the body, incuding such areas as bone, muscle, central nervous system, and the gastrointestinal tract (Moulton, *Tumors of Domestic Animals*, 3rd edition).

Hemangiosarcoma is a malignant tumor of endothelial cells. The tumor occurs most frequently in dogs of about 9 to 10 years of age, although it can occur in other domestic species such as the cow (Moulton). The German shepherd is the breed most affected, and the tumor is seen more in males than in females.

Yersinia enterocolitica:

Y*ersinia enterocolitica* was recently isolated in bacterial cultures of liver tissue taken from several dead chinchillas. On gross examination, fresh liver tissues showed multifocal areas of liver necrosis, or injury. Microscopically, liver tissue revealed a severe suppurative hepatitis, with random microabscesses.These animals were from a group of 100 or more chinchillas in a commercial operation that had suffered recent losses.

Records do not indicate a previous isolation of this organism from British Columbia chinchillas (the more common *Yersinia* species occasionally isolated at this laboratory from chinchillas is *Yersinia pseudotuberculosis*). *Y. enterolcolitica* poses a distinct hazard to other chinchilla breeders, should the organism spread laterally to other herds by sales or movement of breeding stock, so buyers beware. There are no provincial regulations or statutes controlling this organism, as it it does occur in a wide variety of domestic and wild species. Control or elimination of the agent is thus very difficult.

Y. enterocolitica is capable of producing disease in a wide variety of species, including humans. The zoonotic potential of this organism was clearly pointed out to the veterinary practitioner who submitted these specimens, who then passed on this information to the owners. However, although humans are capable of acquiring intestinal disease caused by this organism from animals or water contaminated with animal feces, most human cases appear to be associated with consumption of food contaminated by human carriers (*Hagan & Bruner's Microbiology*, 8th ed, 1988). Out of interest, the most *infamous* bacterial organism in the genus Yersinia is Y. pestis,which was the cause of human bubonic plague in the Middle Ages. The organism was named after the French bacteriologist Yersin, who first isolated it in 1894.

Sheep Submissions to the AHC — January 1992 to June 1997

R. Lewis

Over the last 5 + years, 403 sheep submissions to the AHC resulted in 607 diagnoses. The three major categories of loss related to management/nutrition (107 submissions), bacterial infections (99), and parasitism (55). A final major classification of submission was abortion (69). It is important to realize when assessing these figures that they only reflect the actual numbers of submissions to the AHC. The actual number of animals at risk or similarly afflicted is, of course, much higher. As a result, the dollar loss to each producer in most cases accounted for much more than the value of a single animal.

Nutritional problems were identified in 79 submissions. Emaciation and starvation (21) was the single most important factor in this category. Copper toxicity was responsible for 18 diagnoses in sheep and an additional 16 diagnoses were made of copper deficiency. Copper toxicity accounted for deaths in most of these cases; whereas copper deficiency was probably not the primary reason for the submission to the AHC. Goitre in lambs, due to iodine deficiency, was a common diagnosis (11). White-

Sheep Submissions continued...

muscle disease (vitamin E and/or Selenium deficiency) occurred in eight submissions and vitamins A/E and Selenium deficiency was diagnosed three times. Selenium and vitamin A toxicity occurred in two submissions.

Management-related losses accounted for 28 submissions. In this category were such things as trauma (10), bloat (5), grain overload (4), hypothermia or cold injury (4), hypoglycemia or colostrum-deprivation (3), and metabolic disease (2).

The second single largest category of submissions resulted from bacterial infections and, of these, pneumonia (28) was the single largest reason for submitting specimens for examination. Enterotoxemia (20) and enteritis due to bacterial infection (13) were other prominent diagnoses. Septicemia or blood poisoning was diagnosed in thirteen submissions. Nine sheep had abscesses and *Listeria* sp. infection occurred in seven submissions. Other prominent bacterial infections included Johne's disease (6) and caseous lymphadenitis (3).

Parasitism is the broad category of infection caused by a variety of internal parasites. These included stomach worms (18), parasitic enteritis (17), parasitic hepatitis (flukes) (9), and coccidiosis (4). Lungworm was diagnosed in seven submissions.

There were 69 submissions resulting from abortion in sheep. As in other species, unfortunately no diagnosis was made in 25 (or 36%) of these cases. Diagnostic laboratories are able to identify infectious or nutritional problems associated with abortion but other factors such as chromosomal alterations or trauma cannot be diagnosed. Chlamydia (enzootic abortion of ewes) was the single most prominent cause of ovine abortion and occurred in 16 submissions, accounting for 24% of the diagnoses made. Different bacterial causes of abortion (10; 15% of all abortions) were also noted. Inflammation of the afterbirth without a specific identified organism was diagnosed nine times (13%). Stillbirths (6; 9%) and anomalies (3; 4%) made up the remainder of this category.

Most of the sheep submissions to the AHC were from animals between 3 - 6 months of age (80). Seventy-seven submissions were from neonatal lambs up to one month of age and 75 animals were from the 1- 2 year age group. As noted, fetuses were represented by 69Animals greater than two years old made up 57 submissions. Other ages made up the remainder of the 403 sheep submissions during this time frame.

As a result of reviewing sheep submissions to the AHC, several conclusions may be made:

1. Nutritional deficiencies are common. These resulted from inadequate protein/energy, minerals and vitamins.

2. Copper levels must be carefully monitored in sheep flocks. Toxicities are responsible for death and deficiencies lead to anemia and poor-doing animals. Cattle mineral mixes contain enough copper to be toxic to sheep as do cattle mineral supplements.

Sheep Submissions continued...

3. Management improvements are needed. Shepherds must continually improve facilities to reduce the possibility of trauma and provide good shelters to protect animals from inclement weather. Milk and colostrum intake in lambs must be monitored. Vaccination recommendations must be heeded to prevent clostridial diseases such as enterotoxemia.

4. Pasture management, regular deworming, prevention of overcrowding, and feedbunk placement are all important to prevent parasitism in sheep flocks.

In 1991, the latest year for which figures are available, there were 74,136 sheep in B. C.; it is estimated that in 1995, there were an additional 3,000 animals. Eighteen hundred and seventy producers were responsible for these sheep. Evaluation of our submissions indicate that only 300 of these producers had used the AHC in the five years examined in this review. This means that, across the province, only 16% of all sheep producers had submitted animals for evaluation. As a result, the data presented here is incomplete and the figures probably do not reflect the real situation. The factors identified and broadly categorized are undoubtedly important, however, in most sheep flocks.

If shepherds (and other livestock owners) wish to improve their production and reduce their losses, a specific diagnosis is essential for appropriate treatment, control, and preventative measures. Improved dollar returns from your flock by acting on a specific diagnosis will recover the money spent in diagnostic services many times over.

Info-biological syndrome:

" **F**eeling detached from life, because of the modern flood of information, says David Shenk. A review of his book *Data Smog* notes: 'Our eyes, ears, and brains are the same as those our hunter forebears had. It is as if we were thirsty people trying to drink from a gushing fire hose, and, he says, we are doing ourselves damage.' "

- from *The Globe and Mail*, June 19/97.

Comparative medicine news: Bacterial resistance of *Salmonella typhimurium Phage Type 104*.

S*almonella typhimurium phage type 104* has been identified in livestock specimens at the Agriculture Canada laboratory at Guelph, Ontario. This is a new strain of Salmonella, and, because of its antibiotic resistance, is of concern in human medicine as well as in veterinary medicine.

This strain of *Salmonella* is now very common in the United Kingdom, and appears to be more virulent than other *Salmonella* strains. It may be transmitted through food, but is killed by cooking. Proper food handling will minimize the risk. *S. typhimurium PT 104* is highly resistant to antimicrobial agents and frequently shows resistance to ampicillin, chloramphenicol, streptomycin, sulfonamides, and tetracyclines.

In England, this organism has been isolated from poultry, sheep, pigs, cats, wild birds, rodents, foxes and badgers, and has been transmitted from cattle and sheep to humans.

- excerpts from a faxed news release received at the Animal Health Centre from the Canadian Cattlemen's Association, June 2/97.

Bovine spongiform encephalopathy (BSE or mad cow disease) update:

"..... **B**SE (transmission) from dam to calf is likely to be less than 10 per cent, and appears to be confined to animals born after the onset of BSE in the dam or up to two years beforehand. This level of transmission is not sufficient, by itself, to perpetuate BSE in the cattle population and is likely to have only a minor effect on the rate at which the incidence of BSE declines. It is inevitable that cases infected via animal feed will continue to appear in diminshing numbers for several years. Therefore, although the number of cases infected maternally will be small, they may represent an increasing proportion of the remaining cases detected."

- excerpt from a News Release received at the AHC April 28/97, originating with the British Information Services, Ottawa.

Ed.'s note:

Dr. Robert Clugston of the AHC recently attended a workshop on BSE and related transmissible spongiform encephalopathies (TSE) at the Animal Disease Research Institute, in Nepean, Ontario. The workshop included discussions and video tapes on Chronic Wasting Disease of elk; scrapie of sheep; and BSE. Wet lab procedures were reviewed for the proper collection of brain tissues, their fixation, and submission for TSE surveillance.

Rhodococcus equi: a bacterial antagonist for the equine practitioner

Periodically, young foals of 1 to 3 months age that have a history of pneumonia poorly responsive to treatment are submitted to the AHC for necropsy. A number of infectious agents or other factors may be at play in these cases, but certainly one agent that occurs regularly is the bacterial organism ***Rhodococcus equi***. For the practitioner, this agent is a difficult adversary to overcome.

A brief discussion of this organism is offered here to practitioners. Understanding the organism should help in combatting its destructive activities in these young animals.

R. equi is an aerobic, gram positive bacterium, with a characteristic mucoid appearance on culture plates due to the presence of a capsule. It is largely a soil organism, whose growth requirements are met perfectly by herbivore manure and summer temperatures. Under good conditions, the numbers of organisms can multiply many thousands of times in a single day, considerably increasing exposure of foals in the area. Although adult animals may carry the organism asymptomatically within their intestinal tracts, the organism can multiply rapidly within the gastrointestinal tracts of young foals. *R. equi* is characteristically endemic on some farms, sporadic on others, and unrecognized on most.

In foals, the organism produces a suppurative to pyogranulomatous pneumonia, often with extensive tissue abscessation, and severe inflammation of lung lymph nodes. Intestinal-colonic infection may precede lung involvement.The foal appears to be unique in its susceptibility to *R. equi* infection, probably the result of a natural deficiency or impairment of cellular immune mechanisms in the lungs of animals under 4 months of age. Reports of the isolation of *R. equi* from other species are uncommon, and are often associated with immunosuppression of some type - recently the organism has caused pneumonia in humans that are infected with human imuunodeficiency virus (AIDS); the lung lesions resemble those seen in foals.

R. equi is a facultative intracellular organism, surviving inside the inflammatory cell macrophages (and, incidentally, away from antbiotics) to cause granulomatous inflammation. It is readily able to destroy macrophages, which is the basis for its pathogenicity, or disease-producing capability. The agent appears to evade killing by preventing phagosome-lysosome fusion within the macrophage.

The age of foals developing *R equi* pneumonia coincides with the quantity of humoral antibody in foals, and reflects the decline of maternally-derived colostral antibody by 5-10 weeks of age, which is then followed by the later rise of foal-derived antibody. For the veterinary practitioner, it is worth noting that foals born to vaccinated mares were not protected against experimental or natural infection. Conversely however, the administration of hyperimmune serum to foals on problem farms, obtained from mares vaccinated with an autogenous vaccine, limits the incidence and severity of the disease (Radostits et al, *Veterinary Medicine,* 1994). The precise nature of the protective components in plasma, and whether it is strictly antibody in nature, is not known. The role of cellular immunity in protecting foals against this organism is also poorly understood at present.

Rhodococcus equi continued...

At the very least, these studies indicate the importance of raising young foals in areas with minimal manure contamination. Because of the intracellular nature of *R.equi* and its ability to destroy phagocytic inflammatory cells, the practitioner's ability to curtail the organism with antibiotic therapy will be sorely tested.

- taken in part from *Pathogensis of Bacterial Infections in Animals*, by Carlton L Gyles and C.O. Thoen, 2nd ed, 1993. Iowa State University Press, Ames.

News Item: Vesicular stomatitis in U.S. horses:

The AHC recently received news of recent (May - June 1997) outbreaks of equine vesicular disease in horses in New Mexico, and in Arizona state. The New Mexico outbreak involved two premises, and about 6 horses. One horse showed consistent clinical signs of vesicular stomatitis in the Arizona outbreak. ELISA serology results supported these diagnoses. There was no known epidemiological link between the two outbreaks. All in-contact horses were asymptomatic. Affected farms have a quarantine period of thirty days following the absence of compatible lesions. A public information campaign in the area has heightened awareness among the regional livestock industry, veterinary practitioners, and the public. Epidemiological investigations are ongoing concerning both cases.

Equine vesicular stomatitis is a viral disease of horses that produces vesicles or blisters in the animal's tongue, lips, dental pad, and oral mucous membranes (Radostits et al, *Veterinary Medicine,* 1994). The oral vesicles rupture quickly and cause irritation with profuse salivation. While primarily a disease of horses, it may also infect donkeys, pigs, and cattle. Goats and sheep are resistant. In part because of its marked resemblance to Foot-and-mouth disease in cattle and pigs, the condition is a reportable disease in both the United States and Canada. (Foot-and-mouth disease does not occur in horses). At present, Canada is free of both equine vesicular stomatitis and foot-and-mouth disease.

The Management Factor:

This spring, as in previous ones, underlying problems of management and husbandry were sometimes very apparent on farms with animal health concerns. For example, at no time does good husbandry practise become more obvious than in beef cowherds, during the spring calving season; the opposite is also true.

Where good husbandry and management practises have been lacking, pregnant cows may become nutritionally depleted because of a substandard diet. Inadequate nutrition in the pregnant cowherd then leads to various problems at calving, and beyond, such as dystocias; vitamin and trace mineral deficiencies in the newborns that cripple their natural thrift and viability; lack of colostrum and/or insufficient milk. In some instances, much human heat is generated in combating

Management Factor continued...

bacterial, viral, fungal or protozoal agents as the primary cause of a herd problem when, in fact, these are only secondary opportunists infecting an already debilitated calf. In addition, any newborn calf has little chance of surviving if it is forced to fend for itself within muddy, heavily polluted corrals or yards with inadequate drainage, or obliged to suckle from a manure-caked udder.

Controlling infectious disease in newborns is a constant challenge for the practitioner and the owner, and certainly justifies the energy expended. However, the role of good management and husbandry practices in avoiding these problems in the first place sometimes needs more emphasis. Domestic livestock, captured wild life, game-farmed animals, animals in rehabilitation shelters and even pets, all rely on their human stewards for the provision of their basic needs of food, water, shelter, and a reasonable environment. Having deprived them of their freedom, and in many instances the choice of environment for which nature intended them, it is the very least we can do.

Cellular cities:

".... **H**igher organisms, such as ourselves, are like cellular cities in which groups of cells perform specialized functions and are linked together by intricate systems of communication. In a sense, cells are halfway between molecules and man.We study them to learn, on the one hand, how they are made from molecules and, on the other, how they cooperate to make an organism as complex as a human being.

All organisms, and all of the cells that constitute them, are believed to have descended from a common ancestor cell by evolution. Evolution involves two essential processes: (1) the occurrence of random variation in the genetic information passed from an individual to its descendants and (2) the selection of genetic information that helps its possessors to survive and propogate. Evolution is the central principal of biology, helping us to make sense of the bewildering variety in the living world."

- *Molecular Biology of the Cell*, by Alberts, Bray, Lewis, Raff, et al. Garland Publishing Co., New York and London, 1983.

The key to understanding disease problems is within the cell:

"**L**ong ago it became evident that the key to every biological problem must finally be sought in the cell, for every living organism is, or at one time has been, a cell."

Edmund B. Wilson, from *The Cell in Development and Heredity*, 3rd edition, Macmillan Inc., 1925.

A philosopher's view on truth, and on intellect:

On truth:

....."The discovery of truth is prevented most effectively, not by the false appearance things present and which mislead into error, nor directly by weakness of the reasoning powers, but by preconceived opinion, by prejudice, which as a pseudo *a priori* stands in the path of truth and is then like a contrary wind driving a ship away from land, so that sail and rudder labour in vain."

On human intellect:

....." What light is to the outer physical world intellect is to the inner world of consciousness. For intellect is related to will, and thus also to the organism, which is nothing other than will regarded objectively, in approximately the same way as light is to a combustible body and the oxygen in combination with which it ignites. And as the light is purer the less it is involved with the smoke of the burning body, so also is intellect the purer the more completely it is separated from the will which engendered it. In a bolder metaphor one could even say: Life is known to be a process of combustion; intellect is the light produced by this process."

- Arthur Schopenhauer (1788 - 1860), German philosopher; from Schopenhauer: Es*says and Aphorisms.* Penguin Classics, 1983, with English translation by R.J. Hollingdale.

Poetic vision:

"..... **T**hough much is taken, much abides: and though
We are not now that strength which in old days
Moved heaven and earth, that which we are, we are-
One equal temper of heroic hearts,
Made weak by time and fate, but strong in will
To strive, to seek, to find, and not to yield."

- *from Ulysses, by Alfred, Lord Tennyson*