

The NCVDLS REPORT



Accredited by the American Association of Veterinary Laboratory Diagnosticians

Veterinary News and Information From North Carolina's Diagnostic Laboratories

From The Director by David T. Marshall, DVM

I sincerely hope that the holidays were enjoyable for everyone. For many of us, however, it meant many hours of work completing the comprehensive application for continued AAVLD accreditation which was due on the last day of the year. The deadline was indeed met, and the resulting document was a detailed snapshot of our laboratory system and its operations. We anticipate the three person site review committee to be visiting in May and reviewing all five facilities, a departure from past practices. We look forward to their visit and input into our operations, as well as how we can continue to improve them.



Many of our most active clients will soon be receiving copies of our newly updated User Guide, as well as our redesigned submittal forms. The guide provides general information about NCVDLS facilities, instructions for specimen submittal, fee schedules, and a complete listing of all available test services. Electronic versions of both the User Guide and the submittal forms are available for printing and can be found on the NCVDLS web site. I would encourage everyone to take advantage of the new submittal forms, as they greatly increase our ability to process samples and provide more accurate results in a timely manner.

One factor that continues to negatively impact turnaround time on necropsy cases is a shortage of veterinary diagnosticians within the system. We are currently experiencing one vacancy at each of the Rollins, Elkin, and Rose Hill facilities. All positions have been advertised and are being actively recruited. I encourage you to bear with us during this vacancy period and communicate clearly with our current staff on any cases that may be time sensitive. We will continue to strive to provide the most accurate, timely service as possible in the interim.

Avian Influenza continues to be a "hot topic", and the NCVDLS is at the forefront of surveillance within the commercial, backyard, and wild avian populations. In addition to over 18,000 individual monthly samples being tested from the commercial broiler and turkey industries, our PCR capability is allowing us to test poultry from most of the exhibition, show, and flea market events. We are also performing the North Carolina wild waterfowl testing on tracheal and cloacal swab samples collected by both the USDA-Wildlife Services, as well as our own state Wildlife Resources Commission. Not unexpectedly, we have identified insignificant (non H5 or H7) infection in 5 duck samples collected from the coastal area (four Widgeons and one Lesser Scaup). This active surveillance is important in providing consumer confidence in poultry products, as well as enable early detection and response if a

In This Issue...

Client Corner.....3
Employee of the Quarter..11
Departmental News.....11
Disease Trends.....5
Interesting Cases.....9
Veterinary Staff.....13

Points of Interest...

- *Ascaridia galli*
- FAD Investigation Protocol
- Bovine Metabolic Disease
- Cutaneous MCTs
- Bovine Metritis
- After Hours Policy

NCVDLS-Rollins Lab
1031 Mail Service Center
Raleigh, NC 27699-1031
Phone: (919) 733-3986
Fax: (919) 733-0454
Web site: www.ncvdl.com

Please e-mail NCVDL@ncmail.net with any comments and/or suggestions concerning The NCVDLS Report

Holiday Closings...

- New Year's Day-January 1
- MLK's Birthday-Jan. 15
- Good Friday-April 6

Our laboratories will be closed on the above listed days.



From the Director (continued)

more pathogenic strain of the virus were to be introduced into our state.

On a lighter note, our Rollins laboratory was honored to be the site for the filming of part of a National Pork Board sponsored three dimensional training video on Classical Swine Fever (CSF) surveillance and detection. This video will be used to help train veterinary students, practitioners, and producers on the signs and protocol to follow if CSF is suspected in a swine population. It was quite an experience to observe a real “Hollywood” film crew go about their task, and was glad to be of assistance.

Finally, congratulations to our most recent Employee of the Quarter, Ms. Dell Weaver. Dell is, without a doubt, one of the most dedicated, positive, helpful employees within the Rollins laboratory. In addition to her multiple duties with sample receiving and processing, mail, and supplies, she is never hesitant to pitch in and help others with any task, all with a smile on her face. In addition, she grows a beautiful orchid and has definite expertise in that area. Congratulations and thanks for what you do for us, Dell.

Regards,

David Marshall, D.V.M.

Director





Diagnostic Laboratory Advisory Committee

Dr. Jim Floyd	NCSU- College of Veterinary Medicine
Mr. Larry Wooten	N.C. Farm Bureau
Dr. Richard Kirkman	Private Veterinary Practitioner
Dr. Gene Erickson	NCDA&CS Veterinary Diagnostic Laboratory System
Dr. Rick Sharpton	Perdue, Inc
Dr. Shannon Jennings	Carroll's Foods
Dr. Leslie Wolf	DHHS- State Public Health Laboratory
Dr. Karen Post	NCDA&CS Veterinary Diagnostic Laboratory System
Dr. Eric Gonder	Goldsboro Milling
Dr. Mary Ann McBride	NCDA&CS Veterinary Division
Mr. Jeff Turner	Murphy Brown, L.L.C.
Dr. Randy Jones	Livestock Veterinary Services
Dr. Jennifer Haugland	NCDA&CS Veterinary Diagnostic Laboratory System
Dr. Gene Nemechek	GIS-Hog Slats
Dr. David Marshall	NCDA&CS Veterinary Division

Client Corner

New User Guide and New Submission Forms by **Dr. Jennifer Haugland**



The NCVDLS has been busy updating the list of diagnostic test services and writing a detailed User's Guide. This guide provides a complete list of each test that is available from the North Carolina Veterinary Diagnostic Laboratory System, including preferred sample and expected turn around time. In addition, the user guide provides the current list of fees, specimen submittal guidelines, and the list of North Carolina reportable diseases. The User Guide is being printed at this time and will soon be mailed to each laboratory client along with the new submittal forms.

The submittal forms and guide to using the submittal forms are available on our web site, www.ncvdl.com. At this time, you can download and print these forms. Our next step is to place on the website a version of each form that will enable the user to enter information online and download for submission. Once you have received the new forms, please discard all other NCVDLS submission forms.

**Alpaca and Llama PCR Screening for Persistent BVD Infection** by Dr. Gene Erickson

The following document is a reprint of a memo sent to all NCVDLs camelid BVD PCR clients on January 24, 2007:

Our diagnostic group initiated PCR screening of camelids by using the same type of sample, serum, which is suitable for cattle persistently infected (PI) with BVDV. Shortly thereafter, the Alpaca Research Foundation (ARF) posted recommendations that any BVDV PI status evaluation must be conducted with buffy coat cells. Only EDTA blood samples will provide those cells for RNA extraction for the BVDV real time reverse transcriptase-PCR assay. I have confirmed this recommendation by direct telephone conversation with Dr. Edward Dubovi, Cornell veterinary diagnostic laboratory, and Dr. Clayton Kelling, University of Nebraska-Lincoln veterinary science department. Their and other laboratory scientific findings have fully supported this recommendation. In fact, the UNL had 3 BVDV PI alpacas donated to determine the extent and type of viremia present in those animals. Their studies showed that very low or no levels of BVDV were present in the serum of those PI animals on multiple tests performed while the animals were housed at UNL.

Since most tests are for upcoming sales or to resolve unknown animal PI status, our routine test day is Wednesday of each week. If a client has missed a sale deadline, please call the laboratory to determine if we will be able to assist. An individual animal test takes a half day of technician time, which disrupts other mandated testing performed by the laboratory. Other needs have been identified as we have been testing alpacas for BVDV PI status. Typically, the test is requested to optimize productivity of animals on farm or for a current or pending sale. Commonly, sales prefer microchip ID numbers listed on a PI report with the name of the animals tested. Therefore, whenever possible, submit samples with microchip ID number or provide a statement that the animal does not have a chip. Indicate if a fax report is needed at the time of sample submission.

A separate EDTA blood sample must be provided for this test. Serum will not be accepted for BVDV PI PCR analysis. If an animal has a positive or suspect result, we recommend that the animal be rebled for confirmatory testing.

If serologic testing is needed, both a serum sample and EDTA blood sample should be submitted for those purposes. An incidental request we have received is for pregnancy screening. We do not conduct that assay at our laboratory.

**Foreign Animal Disease Investigation Protocol** by Dr. David Marshall

Several times each year, the State Veterinarian's office or the NCVDLs is notified of clinical disease scenarios that elevate to the level of potential foreign animal disease (FAD) investigations. Incidents of acute multiple deaths without a known cause, vesicular lesions, or other signs consistent with a specific FAD requires rapid and thorough investigation to accurately diagnose and respond if a foreign disease is accidentally introduced into our state.

Veterinary practitioners and company service personnel are reminded that Section 02 of the North Carolina Administrative Code (01 NCAC 52C .0603, Reportable Diseases) obligates veterinarians to report incidents of suspected FAD to the State Veterinarian's office within two hours of suspicion that the disease is reasonably suspected to exist. A list of reportable diseases can be accessed on the Veterinary Division's web site, www.ncagr.com/vet/vetdis.htm, or in our laboratory User Guide online at www.ncvdl.com. The telephone contact number for reporting suspected FADs is (919) 733-7601. After hours and on weekends, the caller will be referred to a pager which is carried at all hours on a rotational basis by staff veterinarians at (919) 733-3986.

When reporting suspected FADs, the caller will be asked a series of questions to develop a history and initial impression as to the cause. Initial instructions will be given, and then consultation will occur with the USDA-APHIS Area Veterinarian In Charge as to a course of action. As a rule, a trained Foreign Animal Disease Diagnostician (FADD) will be dispatched to the site to investigate and gather appropriate samples for laboratory workup, usually at the Foreign Animal Disease Diagnostic Laboratory (FADDL) at Plum Island, New York, or at the National Veterinary Services Laboratory (NVSL) in Ames, Iowa. A priority status will be assigned (Priority 1- highly likely, Priority 2- Unlikely, but possible, or Priority 3- highly unlikely) dependent on the results of the investigation. Testing may also occur concurrently under BSL 3 conditions at the Rollins Laboratory, if warranted. Although not the confirmatory laboratory, preliminary testing at Rollins provides rapid results that can gauge the level of response while awaiting confirmatory results from the USDA laboratory.

Private accredited veterinarians are an important component to FAD surveillance and investigation. While under no obligation to actively participate, we greatly value their input and expertise, and include them within the communication chain so as to properly serve their clients.

After Hours Policy by Dr. Karen Post

To improve our laboratory system and conserve your tax dollars, management had adopted changes in necropsy policies, effective July 2005. Letters were mailed to all our veterinary clients at that time, but we have had several requests to re-circulate this information.

1. Necropsies will not be performed on State holidays or after 5 pm on weekdays, unless they qualify as an emergency. Routine weekend necropsies will be limited from 8 am to 12 pm on Saturdays **at the Rollins Facility only**. Emergency situations are limited to (a) cases of multiple death loss within a herd/flock over a short period of time (24 to 48 hours) in which case the animals are not autolytic, (b) cases of suspected foreign animal disease (foot and mouth, exotic Newcastle, etc.), and (c) zoonotic diseases. An "on-call" laboratory veterinarian will be available by telephone during these times for consultation purposes. Lay clients who have animals that are not considered as "emergency" cases should be encouraged to have their animals necropsied by their veterinarian to prevent a decomposed animal from being presented to the laboratory for necropsy at a later date. Likewise, veterinary clients should be encouraged to perform their own necropsies.



After Hours Policy (continued)

2. Refusal of an animal for necropsy at any time will be at the discretion of the veterinarian assigned to the case and will be based upon the following: (a) an animal is deemed too decomposed for further diagnostic testing, (b) an animal has clinical signs that are consistent with a recent laboratory diagnosis, therefore an additional necropsy is unwarranted, or (c) a diagnosis for an animal has already been obtained and confirmed, therefore a necropsy is unwarranted (e.g. fractured leg, uterine prolapse, or chronic laminitis.).
3. If the necropsy diagnosis is obvious, such as gunshot wound or gastric torsion, no tissues should be submitted for histological diagnosis.

Please note that the remains of animals submitted for necropsy cannot be released from any laboratory unless prior arrangements are made by the owner or submitting veterinarian for cremation by a commercial crematory service.

Disease Trends

Ascaridia galli Infestation in Chickens by Dr. Tahseen Aziz

Ascaridia galli is a parasitic roundworm that infects the small intestine of chickens. Infestation with this roundworm is a common problem in backyard chickens and on broiler breeder farms where litter material is re-used. Growers can readily recognize the adult worm as a long, thick, yellow roundworm in the small intestine. The male is about 50-75 mm long, while the female is about 60-115 mm long.



Figure 1. Small intestine of a backyard chicken heavily infested with the roundworm *Ascaridia galli*.

Life cycle

Ascaridia galli has a direct life cycle; in other words, it needs no intermediate host during its development. The adult females lay thousands of fertile eggs in the intestine of the infected hosts each day, and these eggs are shed to the environment in the droppings. In order for the eggs to become infective to other birds, they must undergo embryonation that result in the development of larvae (immature worms) within the eggs. Two larval stages (first-stage and second-stage larvae) are developed within the eggs outside host. Under optimum conditions of temperature and humidity, the embryo develops over 10-12 days into second-stage larvae that are infective for other chickens. In cold weather, it may take fertile eggs up to 20 days to become infective. *Ascaridia* eggs are relatively resistant to many adverse environmental conditions, due to the ova wall, that protects the embryo and developing larvae. When birds ingest infective eggs in the litter or contaminated feed and water, the larvae are released, usually in the proventriculus and duodenum, and the second-stage larvae proceed down the intestine where they shed their skin and continue to develop to third-stage-larvae.

The larvae live freely in the lumen of the intestine for about 10 days and then either remain in the lumen or



***Ascaridia galli* Infestation in Chickens** (continued)

migrate into the mucosa (lining) of intestine. In most cases, the migrating larvae go no further than the mucosa, yet they are capable of causing significant damage to the intestinal wall as they burrow into mucosa. The location of the larvae in the intestinal wall is also called the “tissue phase” of the life cycle. The larvae stay in the mucosa for about 16-18 days and return to the lumen and continue to grow to adults, starting the life cycle over. *Ascaridia galli* eggs may be ingested by earthworms, and chickens can be infected by ingesting roundworms containing the parasite eggs.

Effect of the parasite on the host

Generally, second-stage larvae are developed into mature adults in about 28-30 days after released from the eggs. Five developmental stages have been recognized in the host; these are three larval stages (second-stage, third-stage, and fourth-stage larvae), immature-adult and mature-adult. Under field conditions, various stages of development are present in the bird at the same time. The adult worms may represent only a small portion of the real burden of *Ascaridia* infestation; the other portions are mainly the tissue-bound third-stage larvae and the intraluminal fourth-stage larvae. The late fourth-stage larvae are visible to the naked eye, but microscopic examination of scrapings of the intestinal mucosa is necessary to visualize the small, third-stage larvae. The parasite is occasionally found in the oviduct and hen’s eggs; these aberrant worms are migrated from the cloaca to the oviduct, with subsequent inclusion in the egg.

Treatment of *Ascaridia galli* infestation

The negative impact of *A. galli* infestation on the production performance of chickens should not be underestimated. It is logical to assume that the effect depends on the number of larvae and adult worms in the intestine. Since the parasites share with the host the nutrients in the feed, infestation can affect feed conversion and cause weight loss and even emaciation. Because the “tissue phase” is the most damaging phase of infestation, it is possible that massive migration of the larvae into the intestinal mucosa is occasionally sufficiently severe to result in mortality. Also, since migration of the larvae into and from the wall of the intestine can cause severe damage to the intestinal mucosa, this may predispose birds to secondary infection by opportunistic bacteria.

Anthelmintics are used either on a “routine” basis (i.e., on the basis of the assumption that the flock is infested) or on an as-needed basis (i.e., after diagnosis of *Ascaridia* infestation in the flock). Regular monitoring of the flock by necropsy for *Ascaridia* infestation allows the use of anthelmintics on “as-needed” basis rather than on “routine” basis.

Piperazine is the only anthelmintic approved in the United States for the treatment of chicken flocks infested with *A. galli*. It is available commercially for administration via drinking water. It is important to know that piperazine is effective only against adult worms. To be most effective, piperazine should be consumed by birds in a period of a few hours. Using the correct dosage and amount of drinking water is very crucial for successful treatment. As mentioned previously, adult population of *A. galli* inside the host represents only a portion of the real burden of *Ascaridia* infestation (adult and larvae), and because piperazine is effective only against adult worms but not the larvae, it is necessary to repeat treatment.

Fenbendazole, another anthelmintic, is approved for use in turkeys but not in chickens. Fenbendazole is approved in the United States under the brand name Safe-Guard® for use as feed additive in turkeys to control *Ascaridia dissimilis* and *Heterakis gallinarum* infestations. It is effective against both larvae and adult worms.

**Ascaridia galli Infestation in Chickens** (continued)**Prevention strategies**

The most critical measure in preventing *Ascaridia* infestation in problem farms is the more frequent removal of used litter, followed by thorough cleaning (including washing) and disinfection of the house, especially the floor. It is important to realize that commonly used disinfectants have no effect on the eggs of *Ascaridia*. Although some proponents advise the application of salt at a rate of 60 pounds (30 kilograms) per 1000 square feet (93 square meters) on the ground after removing litter, the practice is detrimental to equipment and can cause problems with groundwater contamination during cleanout. Desiccation of sufficient duration (dependent on environmental conditions) is detrimental to *Ascaridia* eggs and therefore houses should be allowed to dry completely before placing a new flock. If possible, supplementation of additional heat to raise the temperature of the barn for a minimum of three days is very helpful, especially in winter. Even when the litter in the house is re-used, it is always beneficial, if possible, to heat the empty house for a minimum of three days before placing a new flock. Alternatively, stacking the old litter in a pile for 7-10 days will probably kill *Ascaridia* eggs due to the high temperature in the pile. Although no study has been done to determine the efficiency of this method, it has been shown that a 12-hour exposure at 43°C (110°F) kills the eggs at all stages of development. A pile of litter most likely reaches a temperature higher than 43°C. Once removed from the house, litter should be removed completely off the premises to prevent recontamination.

Metabolic Disease Alert in Cattle by Drs. Jennifer Haugland and Peter Moisan

Since October 2006, there has been an unusual increase in the number of deaths of late gestation and early lactation beef cows and an increase in stillbirths within the NCVDL system. Seven herds affected by periparturient deaths or stillbirths have been seen at the Rollins Laboratory from October 30 to December 31. These affected herds are located in counties of North Hampton, Edgecombe, Duplin, Johnston, Cumberland, Chatham, and Randolph. The Arden and Griffin Laboratories have each identified single herds with similar problems and these herds are located in Cleveland and Rowan counties.

The index herd had a history of 13 consecutive stillborn calves after 50 live births. Most of these stillborn calves were delivered without assistance and in the few calvings that were assisted, the calves were easily pulled. No infectious agents were identified in the 4 calves submitted for necropsy and the calves were not exceptionally large; therefore, a presumptive diagnosis of uterine inertia was made. Since the cows were in good body condition and there was no evidence of anaplasmosis, hypocalcemia and hypomagnesemia were considered the primary differentials.

In November, cows from four separate herds were presented to the Rollins Laboratory with the history of recumbency during late gestation or early lactation. The down cows were weak or ataxic upon standing, trembling, or were found in sternal or lateral recumbency. Two animals in one herd had been successfully treated with intravenous calcium preparations. No gross lesions were found in most cows, but a bloat line was identified in a few. Two of these herds also had a history of a few stillborn calves. At the end of November, two additional herds with stillbirths were presented to our laboratories. Adult cows from 2 more herds were diagnosed with hypocalcemia and hypomagnesemia in December.

A diagnosis of hypocalcemia or hypomagnesemia at necropsy is often a presumptive diagnosis because serum is not available and the animal is often too autolytic for analysis of ocular fluid. In none of our cases were infectious agents detected, and no gross lesions other than bloat lines were identified. Hypocalcemia, hypomagnesemia, and possibly hypophosphatemia should be considered in herds with stillborn calves in which there is no explanation for a delay of Stage 2 labor (that is, the calves are not large or malpositioned, and there

**Metabolic Disease Alert in Cattle** (continued)

are no obstructions of the birth canal). These metabolic deficiencies should also be considered when there are down or dead groups of cows during late gestation or early lactation. Access to free choice high magnesium minerals does not seem to preclude the development of magnesium deficiencies because several of the above herds did have high magnesium mineral blocks in the pastures. Several of the affected herds were grazing fescue or rye pastures that were fertilized with either poultry litter or hog lagoon water. This high potassium manure applied on pastures or hay fields can decrease magnesium absorption in cows and can have a negative effect on calcium mobilization from bone stores. The subsequent low serum concentrations of magnesium and calcium can lead to muscle weakness, uterine inertia, and possibly death in cows that have high fetal or lactation demands or are trying to contract the uterus during parturition.

We encourage practitioners to contact Drs. Haugland or Moisan at the Rollins Laboratory for any updates or questions, particularly if they can share cases with similar findings.

Cutaneous Mast Cell Tumors by Dr. Steve Rushton

Cutaneous Mast Cell Tumors (MCT) are one of the most common canine skin tumors diagnosed at the North Carolina Veterinary Diagnostic Laboratory System. These masses typically are seen in adult dogs (average age of 8 years) with no sex predilection. The lesions are most commonly found on the trunk and limbs and less frequently on the head. Breeds of dogs such as the Boxer, Boston Terrier, Bull Terrier, Labrador Retriever, and Shar Peis are at increased risk. Shar Peis appear to develop lesions at a younger age and are more likely to develop multiple lesions.

Mast cell tumors are classified into three distinctive grades by veterinary pathologists that suggest the biological behavior and expected survival rate.

Grade I: MCT-I have well-differentiated cells and the masses are small, well circumscribed, and typically located within the superficial dermis. There are rare mitotic figures and moderate to large numbers of eosinophils. These masses rarely recur and have a very high survival rate

Grade II: MCT-II have slightly pleomorphic cells and the masses tend to be larger, deeper, and not as well circumscribed than Grade I tumors (MCT-I). These cells have a low to moderate mitotic activity with fewer eosinophils. These masses also have a low to moderate metastatic potential and an approximate 55 percent 3.5 year survival rate.

MCT-II are the most common Mast Cell Tumors seen at the NCVDLs

Grade III: MCT-III contain poorly-differentiated cells and the masses tend to be large, poorly-circumscribed and extend deeper into the subcutis. The intracytoplasmic basophilic granules are often indiscernible without special stains. The cells are highly pleomorphic with a moderate to high mitotic rate and small numbers of eosinophils. These masses have a high metastatic rate and an approximate 15 percent 3.5 year survival rate.

Biopsy Submissions:

Mast Cell Tumors are generally unencapsulated and are commonly arranged in scattered individual cells and cords of cells within the subcutis that often dissect through lobules of subcutaneous/dermal adipocytes (fat). The scattered nature of the cells along the microscopic margins of the masses can make surgical removal quite difficult for the practitioner, as compared to a well-encapsulated epithelial tumor.



Cutaneous Mast Cell Tumors (continued)

We recommend at least 2 cm deep margins (to or including the panniculus muscle) and 2 cm lateral margins on ALL SKIN masses to help ensure that difficult masses like Mast Cell Tumors have been removed completely.

At the NCVDLS approximately 90 to 95 percent of the MCTs are of the Grade II variety (MCT-II) and the remaining 5 to 10 percent of masses are split equally among the Grade I and Grade III variants.

Approximately 50 to 60 percent of the MCTs submitted to the NCVDLS demonstrate neoplastic cells on the deep or lateral margins consistent with incomplete excision.

An informal retrospective study at the NCVDLS shows that Grade I and Grade II MCTs generally do not metastasize. The Grade II (MCT-II) variants tend to **locally recur** even with microscopically complete excision.

The Grade III (MCT-III) tumors, however, **often spread** to the regional lymph nodes and the metastatic rate tends to be rather high. Regional lymph nodes of MCT-III need to be removed and examined for evidence of metastasis.

In conclusion, Mast Cell Tumors are the most common canine cutaneous tumor seen at the NCVDLS. Most of these tumors are of low malignancy; however, the majority of the masses sent to the NCVDLS are incompletely excised, leading to an increased chance of local invasion, recurrence or metastasis.

Interesting Cases

Bovine Metritis by Dr. Peter Moisan

At the weekly rounds held on January 4, 2007, it was noted that the number of bovine necropsies in the NCVDLS had increased from October through December 2006, the same period of increase as in 2005. With calving season approaching for many herds, these elevated numbers are cause for concern. Periparturient beef cattle diseases have been seen in abundance. In some instances, the diseases have been metabolic in nature (Please see the accompanying article by Dr. Haugland). The diagnosticians and pathologists have seen a number of cases of metritis, including fatal cases. Though this is not the most common cause for death at this time of year, metritis can be fatal and it can have a significant impact on profitability. Although the main focus here is on bovine uterine disease, most features also apply to diagnostics in cases of small ruminant metritis as well. It is considered prudent to include a recent descriptive classification of the types of bovine postpartum metritis:

Classification of postpartum metritis in cattle:

Puerperal metritis – abnormally enlarged uterus and a fetid watery red-brown uterine discharge, associated with signs of systemic illness (decreased milk yield, dullness, or other signs of toxemia), and fever of 39.5°C within 21 days of calving.

**Bovine Metritis** (continued)

Clinical metritis – abnormally enlarged uterus with a purulent discharge identifiable at the vagina within 21 days of parturition but without other systemic signs of illness or fever.

Clinical endometritis – characterized by the presence of purulent discharge (greater than 50 percent neutrophils) identifiable in the vagina within 21 days or more after parturition, or mucopurulent (50 percent neutrophils and 50 percent mucous) discharge detectable in the vagina after 26 days postpartum.

Subclinical endometritis – defined by greater than 18 percent neutrophils in uterine cytology samples collected 21 to 22 days postpartum, or greater than 10 percent neutrophils at 34 to 47 days postpartum, all in the absence of clinical endometritis.

Pyometra – accumulation of purulent material within the uterine lumen in the presence of a persistent corpus luteum and a closed cervix.²

Puerperal metritis (Classification 1) is often seen in our laboratory system. The lesion is fatal and relatively easy to diagnose. Features include the fetid uterine discharge and lesions attributable to septicemia, with hemorrhages over the visceral surfaces of many tissues. The placenta is often retained. Gas in the wall of the uterus often represents a special case, with clostridial agents seen histologically. Calving difficulty is often reported in the history.

Clinical metritis (Classification 2) is also a frequent finding in necropsy cases. In these cases, there are often other lesions that are associated with the metritis. Mastitis, displaced abomasum, ketosis, and indigestion are secondary lesions. Uterine inertia in the postpartum period is a special case often involving hypocalcemia (Please see the article on metabolic diseases of beef cows by Dr. Haugland.).

Collection of samples for bacteriology testing is not often necessary with bovine metritis. The process of parturition is not aseptic; the healthy uterus merely tends to disallow the growth of most pathogens. The anaerobic environment and the “ascendancy of organisms” that occur during the involution of the normal postpartum bovine uterus are remarkably orderly.¹ In the early stages, 1 to 2 days after calving, *Escherichia coli* and anaerobic bacteria predominate. Clostridia may predominate, resulting in a few cases of peracute, gangrenous metritis. In cases of clostridial metritis, it is likely that the *Clostridium* species (or at least pathogenic *Clostridium* species) out-compete the more innocuous agents and cause infection. By 14 days postpartum, *Arcanobacterium pyogenes* is the predominant bacterial inhabitant of the diseased uterus (clinical or subclinical metritis or endometritis). It is probably most often accompanied by multiple species of more fastidious anaerobic bacteria by this time.

In any case of metritis or endometritis, financial losses can be direct or indirect. The direct losses stem from treatment costs and/or death of the cow and calf. Indirect losses result from the depressed milk production by the cow, resulting in loss of milk income or stunted growth of the calf. Anorexia and endotoxemia both negatively impact milk production. In addition, delayed breeding back represents a significant loss of production as well.

1. Dohmen MJ, Joop K, Sturk A, Bols PE, Lohuis JA. Relationship between intra-uterine bacterial contamination, endotoxin levels and the development of endometritis in postpartum cows with dystocia or retained placenta. *Theriogenology*; 2000. 54:1019-1032.

2. Sheldon I, Lewis G, LeBlanc S, Gilbert R. Defining postpartum uterine disease in cattle. *Theriogenology*; 2006. 65:1516-1530



Employee of the Quarter

Congratulations Dell!!

We would like to congratulate Dell Weaver for being honored as our Fall Employee of the Quarter. Dell works in the receiving area of Rollins Laboratory as a Medical Laboratory Assistant. She is a very reliable and conscientious worker

who does what it takes to get the job done. Every specimen that is delivered to the laboratory passes through Dell's capable hands. This requires her to remain professional and organized. Dell is also known for her friendliness and helpful attitude. When needed, Dell will aid others with whatever the task may be. Congratulations Dell for a job well done!



Departmental News

ROLLINS LABORATORY:

Histology... Welcome back Diane Pearson! Diane, former section supervisor, retired in May 2006 with 30 years of service. She has been hired back on a part-time basis to assist with slide preparation.

Molecular... Rollins Laboratory would like to welcome **April Compeau** into a Medical Laboratory Technologist II position as of December 1, 2006. April comes to Rollins from a private industry laboratory.

Quality Assurance and Safety... On November 29, 2006, **Kathy Schmidt** attended a CPR and First Aid Course in downtown Raleigh.

Serology... Edie Noel has resigned her position effective January 24, 2006. Edie has been an employee for over 10 years and has decided to return to clinical practice as a veterinary technician. Her cheerful personality will be greatly missed.

Virology... Jean Kennedy resigned her position in mid-December to pursue other interests. Both **Kim Howle** and **David Marshall, DVM** attended the Johne's Disease Advisory Committee, a group of veterinarians, dairy and beef producers, and state and federal officials who make decisions on the state's Johne's Disease control and eradication policies on January 9 in the Agronomics Building in Raleigh.



Departmental News (continued)

Creative Holiday Decorations:

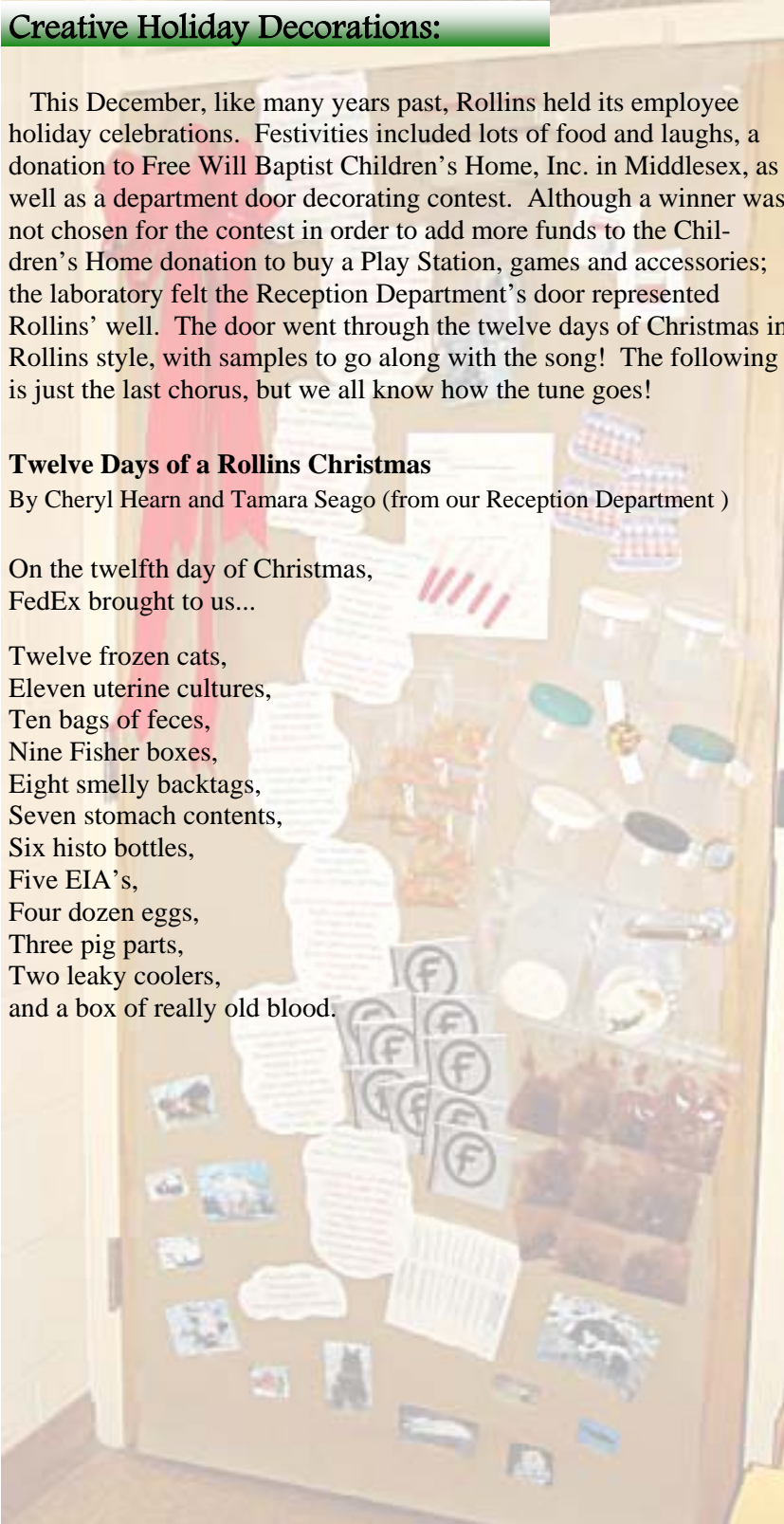
This December, like many years past, Rollins held its employee holiday celebrations. Festivities included lots of food and laughs, a donation to Free Will Baptist Children's Home, Inc. in Middlesex, as well as a department door decorating contest. Although a winner was not chosen for the contest in order to add more funds to the Children's Home donation to buy a Play Station, games and accessories; the laboratory felt the Reception Department's door represented Rollins' well. The door went through the twelve days of Christmas in Rollins style, with samples to go along with the song! The following is just the last chorus, but we all know how the tune goes!

Twelve Days of a Rollins Christmas

By Cheryl Hearn and Tamara Seago (from our Reception Department)

On the twelfth day of Christmas,
FedEx brought to us...

Twelve frozen cats,
Eleven uterine cultures,
Ten bags of feces,
Nine Fisher boxes,
Eight smelly backtags,
Seven stomach contents,
Six histo bottles,
Five EIA's,
Four dozen eggs,
Three pig parts,
Two leaky coolers,
and a box of really old blood.





Veterinary Staff

Rollins Laboratory (919) 733-3986

Director

Dr. David Marshall

Assistant Director

Dr. Karen Post

Veterinary Diagnosticians

Dr. Jennifer Haugland

Dr. Stacy Robinson

Vacant

Veterinary Pathologists

Dr. Tahseen Abdul-Aziz

Dr. Peter Moisan

Dr. Steven Rushton

Dr. Martha Hanes

Veterinary Microbiologist

Dr. Gene Erickson

Arden Laboratory (828) 684-8188

Director

Dr. Richard Oliver

Veterinary Diagnostician

Dr. David Drum

Elkin Laboratory (336) 526-2499

Director

Dr. Darrell Rector

Veterinary Diagnostician

Vacant

Monroe Laboratory (704) 289-6448

Director

Dr. Kim Hagans

Veterinary Diagnostician

Dr. Reg Ridenhour

Rose Hill Laboratory (910) 289-2635

Director

Dr. Carlton Rouse

Veterinary Diagnostician

Vacant Position

