

Disease Surveillance and Investigation Branch

DISEASE SURVEILLANCE REPORT

Northern Ireland Disease Surveillance Report, January to March 2017

- Pneumonia in cattle
- Malignant catarrhal fever in cattle
- Tumours in sheep
- Pneumonia in pigs
- Histomonosis in chickens

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for January to March 2017

CATTLE:

Respiratory diseases

Respiratory disease was identified in 84 cattle post mortem submissions between January and March 2017. The most common pathogens identified included *Mycoplasma bovis* (thirty cases), *Pasteurella multocida* (fifteen cases), *Mannheimia haemolytica* (eleven cases), *Trueperella pyogenes* (eleven cases), infectious bovine rhinotracheitis (five cases) and *Histophilus somni* (three cases).

Pneumonia due to infectious bovine rhinotracheitis (IBR, BHV-1) and secondary *P. multocida* infection was diagnosed in an adult dairy cow from a herd experiencing a small spate of sudden deaths in the milking herd. Post mortem examination showed fibrino-suppurative rhinotracheitis. There was consolidation of the left apical lung lobe, right apical, middle and the antero - ventral aspect of the diaphragmatic lobes. Consolidated lung was intensely red with pale coalescing foci of necrosis and pronounced oedema of interlobular septae. The broncho-mediastinal lymph nodes were enlarged and haemorrhagic. Histological examination of the lung tissue showed multiple broncho-centric foci of coagulative to caseous necrosis bordered by dense zones of neutrophils and oat cells. Adjacent alveolar spaces were flooded with inflammatory fluid, fibrin, macrophages and neutrophils. There were many intra-lesional bacterial clumps present and *P. multocida* was recovered in moderate growth from the lung tissue. Frozen sections of trachea were positive by immunofluorescence for the presence of IBR antigen, the *Myc. bovis* RT-PCT result was negative.

Malignant catarrhal fever (MCF) was diagnosed in an eighteen-month-old bullock from a small herd experiencing deaths and showing clinical signs in several more animals possibly attributable to BVD or IBR infection. The gross post mortem findings and histological results, in particular the perivascular lymphocytic cuffing in the brain and focal interstitial nephritis in the kidney cortex were considered to be consistent with malignant catarrhal fever. The diagnosis was confirmed by a positive result for Ov HV-2 nucleic acid by real time PCR. The history in this case showed that cattle had been exposed to a lambing sheep flock. It was noted that whilst usually sporadic, small outbreaks of MCF do occur in some herds from time to time.

Alimentary diseases

Neonatal enteritis

The pathogens identified in neonatal bovine faecal samples during the quarter are shown in TABLE 1. Overall, *Cryptosporidium* species and Rotavirus were the most common pathogens identified.

TABLE 1: Pathogens identified in neonatal bovine faecal samples in Northern Ireland, January to March 2017

Pathogen	Number	
	Tested	Positive (per cent)
<i>Cryptosporidium</i> species	297	123 (41.1%)
Rotavirus	291	110 (37.8%)
Coronavirus	293	50 (17.1%)
<i>Escherichia coli</i> K99	141	1 (0.7%)

Other enteric conditions

Parasitic ova found in ruminant faeces samples submitted during the period are shown in TABLE 2.

TABLE 2: Endoparasitic infections in ruminants in Northern Ireland, January and March 2017

	Total	No of parasitic ova					% positive
		Negative	+	++	+++	++++	
Liver fluke							
Bovine	618	527	64	25	2	0	14.7%
Ovine	303	215	23	40	7	18	29.0%
Paramphistome							
Bovine	619	222	62	155	56	124	64.1%
Ovine	303	178	30	54	20	21	41.3%
Coccidia							
Bovine	690	623	58	8	0	1	9.7%
Ovine	341	179	138	10	3	11	47.5%
Strongyle worm egg count							
	Total	<500 epg	≥500 epg				% Positive
Bovine	685	673	12				1.75%
Ovine	334	250	84				25.1%

≥500 eggs per gram of faeces (epg) was considered of likely clinical significance
 + Low, ++ Moderate, +++ High, ++++ Very high

Ragwort poisoning

Poisoning by pyrrolizidine alkaloids due to ingestion of ragwort (*Senecio jacobaea*) was diagnosed in bullocks in two separate herds during the reporting period. Histologically there was hepatic fibrosis, megalocytosis and biliary duplication in both cases with additional extensive vacuolation of brain white matter consistent with hepatic encephalopathy in one case. In both cases the veterinary practitioner was cautioned that aflatoxicosis may cause similar pathology.

Acidosis

Two nine-month-old bullocks were submitted with a history of sudden death. On gross examination both had alimentary lesions consistent with the over-feeding of grain, one bullock had a large full-depth abomasal ulcer associated with fatal haemorrhage and the other showed impaction of the rumen with fibre and a large quantity of fermenting grain with a strong acidic smell.

Johne's disease

Examination for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) was carried out by microscopic examination, with Ziehl-Neelsen staining, on 188 bovine faecal samples. 13 samples (6.9 per cent) contained acid-fast organisms typical of MAP. Of 5754 bovine blood samples that were tested for antibodies to MAP 399, (6.9 per cent) were positive.

Johne's disease was diagnosed on post mortem examination of an adult cow submitted with a history of chronic diarrhoea. The carcass was emaciated and the mucosa of the terminal jejunum and ileum was thickened and corrugated. Histological examination of affected intestine and mesenteric lymph nodes showed the presence of acid fast organisms in Ziehl-Neelsen stained sections and a diagnosis of Johne's disease was made on this basis.

Reproductive and mammary diseases

Abortion

Specimens from 152 bovine abortions and stillbirths were examined during the 1st quarter. Significant pathogens were detected in 66 cases (43.4 per cent). Of these, *Bacillus licheniformis* (19 cases, 12.5 per cent) was the most commonly identified pathogen. Other pathogens identified included *T. pyogenes* (15 cases, 9.9 per cent), BVDV (6 cases, 3.9 per cent), *Neospora caninum* (5 cases, 3.0 per cent) and *E.coli* (4 cases, 2.6 per cent)

Schmallenberg virus infection (SBV)

During the reporting period, antibodies to Schmallenberg virus were detected in two calves with skeletal deformities from two different herds and a cow from a herd experiencing abortions and calf abnormalities. Whilst an antibody positive does not confirm the involvement of the virus, it provides evidence that this virus is circulating again in Northern Ireland.

A three-day-old calf born into a dairy herd never previously vaccinated against SBV was presented for examination having been euthanased on welfare grounds. Necropsy confirmed a cleft palate, with milk present in the nasal passages, mild medial deviation of both fetlocks in the front legs, mild lateral deviation of both fetlocks in the hind legs and limited flexibility of both hock and elbow joints. There was mild kyphosis of the thoracic spine. Brain histopathology was unremarkable. The foetus was sero-positive for SBV but no SBV nucleic acid was detected in foetal tissues by RT-PCR. It was considered that the most likely scenario was active sero-conversion of the foetus with clearance of SBV from foetal tissues.

Mastitis

A total of 240 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. 11 (4.6 per cent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 32 samples. *E. coli* was the most frequently isolated organism and accounted for 24.6 per cent of isolates cultured. Other frequently identified organisms included, *Streptococcus uberis* (16.3 per cent), *Staphylococcus aureus* (7.5 per cent) and *Streptococcus dysgalactiae* (5.0 per cent).

Neurological diseases

Clostridium botulinum type D toxicosis was diagnosed in 2 cases during the 1st quarter of 2017.

Meningitis due to *Mycoplasma bovis* infection

Arthritis and meningitis due to *Myc. bovis* infection was diagnosed in a one – year –old bullock from a herd in which a number of animals are going lame and showing respiratory signs. At necropsy the left carpal, hock and fetlock joints and both stifle joints were distended by excess fluid. The meninges overlying the caudal left cerebral hemisphere and the dorsal cerebellum were thickened by fibrosis and adhered to the brain tissue. Over the cerebellum there were multiple 1 mm wide purulent foci. Histologically there was a florid lymphocytic infiltrate into the meninges with perivascular cuffs in the underlying neuroparenchyma, with multiple foci of necrosis, bordered by cell debris and encapsulated in fibrous reaction. There was moderate to marked specific staining for *Myc. bovis* by immunohistochemistry within the necrotic material of the lesions and joint fluid was positive for the presence of *Myc. bovis* nucleic acid by RT-PCR.

Other diseases of cattle

Cardio-vascular system disease

Rupture of the celiac artery leading to catastrophic intra-abdominal haemorrhage was the cause of death in a six-year-old dairy cow which had gone down shortly after calving.

During the quarter, vegetative endocarditis of the pulmonary valve with septic pulmonary thrombo-embolism was diagnosed in a one-year-old Charolais bull calf from one herd and in two adult dairy cows from a different herd (FIGURE 1). *T. pyogenes* was cultured from the heart valve of the bull and in one of the dairy cows there was associated abscessation of the right ventricular free wall.

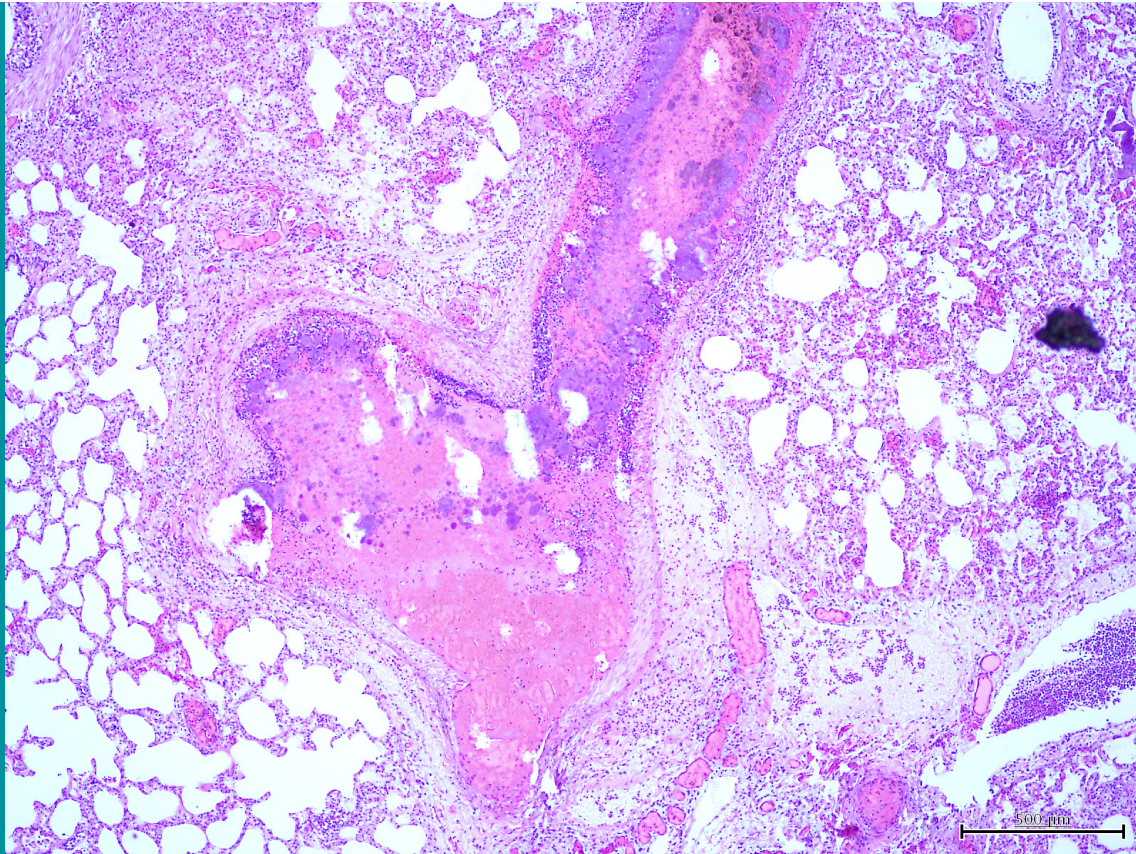


Figure 1

Pulmonary thrombo-embolism in a dairy cow

Lymphosarcoma

Lymphosarcoma of probable thymic origin was diagnosed in a twenty one – month – old steer which was submitted with a history of inappetance, pyrexia and palpably enlarged lymph nodes leading to deterioration and death. On gross examination there was a large solid pale mass containing necrotic foci extending from the proximal trachea distally along both sides of the trachea (FIGURE 2) but with the bulk of the mass on the right side, causing lateral deviation of the trachea. The mass extended through the thoracic inlet with a large mass of tissue present within the thoracic cavity anterior to the heart. There was marked thickening of the pericardium. The liver was vastly enlarged with pale, rounded borders and diffuse pale foci were present on the serosal surface. There was a nutmeg appearance of congestion on incision of the hepatic parenchyma. The spleen and carcass lymph nodes were enlarged.

Histological examination showed widespread infiltration of organs and lymph nodes with dense sheets of lymphocytes, often with complete effacement of the normal tissue architecture. The gross and histological findings were considered consistent with multicentric lymphosarcoma, which in this age of animal is usually of thymic origin and not associated with EBLV infection.

See Figure 2 on next page

**Figure 2**

Lymphosarcoma in a steer, necrotic foci in the large intra-thoracic mass can be clearly seen

Urinary tract disease

Urolithiasis was diagnosed in an eighteen-month-old bull. On gross examination there were several calculi present in the pelvis of the right kidney, the bladder was distended with urine and contained several more calculi and fine sand. There was a blood clot present in the urethral lumen at the sigmoid flexure and there was a hard calculus obstructing the distal penile urethra. A history could not be obtained in this case but it was noted that urolithiasis in bulls is usually associated with concentrate feeding.

Hydronephrosis and hydro-ureter associated with ureteral constriction were diagnosed in a four-year-old water buffalo cow which was found dead. On gross examination there were cystic dilations of pelvis and medulla in all the renal papillae of both kidneys. The ureters were dilated with one annular, fibrous constriction in the left ureter and two separated annular constrictions in the right ureter which at these sites markedly reduced the diameter of the ureters. The bladder was small with a moderate volume of urine present.

SMALL RUMINANTS: SHEEP

Respiratory diseases

Respiratory disease was identified in 23 ovine post mortem submissions during this quarter. Jaagsiekte (twelve cases), pasteurellosis (six cases) and parasitic pneumonia (four cases) were the most common diagnoses. It was noted that culling of thin ewes with submission for full post mortem examination is a very important means of detecting Jaagsiekte in a flock.

Johne's disease

Fifteen ovine faecal samples were examined microscopically using Ziehl-Neelsen staining for MAP. No samples contained any acid-fast organisms typical of MAP. 9 ovine bloods samples were tested for antibodies to MAP during this quarter, 2 samples (22.2 per cent) were positive.

Dosing gun injuries and choke

Dosing gun injury with erosion of the wall of the carotid artery in the neck was the cause of death in an adult ewe which died after a history of non specific malaise and respiratory signs accompanied by haemorrhage immediately prior to death. At necropsy there was a bolus embedded in the wall of the oesophagus with an adjacent fibrous tissue enclosed cavity in the soft tissue of the neck, containing clotted blood from erosion in the wall of the carotid artery which ran along one wall of the cavity. The ewe had bled out and there was aspirated blood in the lung tissue and large clots of swallowed blood in the rumen.

'Choke' due to impaction of the oesophagus with sugar beet pulp was diagnosed in an adult ewe in a flock in which choking on feed had been described.

Trichostrongylosis in store lambs

PGE and trichostrongylosis were diagnosed in a group of six – month - old store lambs in early January, the group were described as dull and this with diarrhoea and deaths. Intestinal worm counts showed the presence of 48,237 *Teladorsagia circumcincta* and 27,563 *Ostertagia* sp in the abomasum and 80,000 *Trichostrongylus vitrinus* in the small intestine. The anthelmintic programme in use in this flock was inadequate and routine faecal egg count monitoring had not been used.

Nutritional and metabolic disease

Fatty liver in lambing ewes

Fatty infiltration of the liver and elevated beta-hydroxy butyrate levels was seen in two flocks in which triplet – bearing ewes were in over-condition during the pre-lambing period. In one case there had been rupture of the right atrium believed to be due to the increase in intra-abdominal and intra-thoracic pressure associated with too high abdominal fill due to fat deposition and uterine distension.

Reproductive diseases

Abortion

Specimens from 199 ovine abortions and stillbirths were examined during the 1st quarter of 2017. The pathogens identified were *Toxoplasma gondii* (65 cases, 32.7 per cent), *Chlamydophila abortus* (32 cases, 16.1 per cent) and *E. coli* (14 cases, 7.0 per cent).

Schmallenberg virus infection (SBV)

A term stillborn lamb was submitted from a lowland flock in mid February. At necropsy, severe abnormalities with arthrogryposis of all four limbs were noted. There was very little movement in spinal column and the spinal cord was very narrowed. The cranial cavity was small with thick overlying cranial bone, there were small cerebral hemispheres and the cerebellum was absent. Histological examination showed areas of white matter vacuolation in the spinal cord but a histiocytic mening-oencephalitis was not present in this case. Virus detection tests were negative for BTV and BVDV (BD) but SBV nucleic acid was detected in foetal tissues (brain, spinal cord, liver, lung and kidney) by RT-PCR. Foetal fluid was seronegative for SBV and BTV. SBV was considered likely in this case.

Neurological diseases

Two cases of listeriosis were confirmed by post mortem examination during the 1st quarter of 2017.

Skin diseases

Nine samples were examined for the presence of sheep scab mites during the reporting period, of these five (from four different flocks) were positive

Other diseases of small ruminants

Lymphoma, ovarian cystadenocarcinoma and intestinal adenocarcinoma in alpacas and ewes
Lymphoma was diagnosed in a six – month – old alpaca which presented with ill-thrift, tender abdomen and tachypnoea. On post mortem examination the liver was massively enlarged (FIGURE 3) and occupied most of the ventral abdomen and contained military pale nodules up to 5 mm in diameter. Small raised pale nodules were present in the renal cortex. Histological examination of the liver showed variably sized round tumour cells forming frequent nodules throughout the parenchyma. In some nodules there was degeneration of cells at the centre of the nodule. Small nests and packets of tumour cells were present among the hepatic cords. There was massive disruption to hepatic architecture and severe loss of hepatocytes.

See Figure 3 on next page

Cystadenocarcinoma in a ewe

Cystadenocarcinoma similar to papillary cystadenocarcinoma previously described in bitches and arising from the ovarian epithelium was tentatively diagnosed in an eight – year –old ewe. At post mortem examination the liver was found to be soft, pale, friable and firmly adhered to the diaphragm. Multiple firm, dark red nodules were found attached to the peritoneum and serosal surfaces of the viscera. The uterine wall and fallopian tubes were heavily fibrosed.

**Figure 3**

Massive enlargement of the liver due to lymphoma in an alpaca

Histological examination of the diaphragmatic muscles, peritoneum and wall of the uterus and fallopian tubes showed scattered acini of neoplastic tissue with an associated scirrhous reaction. Within each acinus there was a lumen, and the lining cells were heteromorphic, sometimes necrotic and displayed a moderate mitotic index.

Annular stenotic intestinal adenocarcinoma was diagnosed in an aged ewe which died shortly after lambing. In the mid-jejunum there was a thickened segment occluded by haemorrhagic necrotic content. Histological examination of the lesion showed the submucosa and muscularis layer to be infiltrated by poorly formed acina and small groups of irregular cuboidal cells, each with a foamy basophilic cytoplasm. There was a low mitotic index and the infiltrated area of tissue was heavily sclerosed.

HORSES:

114 swabs were examined for the presence of *Tayorella equigenitalis* during this quarter, all were negative. 5 swabs were cultured from horses with a history suggestive of strangles during this quarter, all were negative. Peritonitis due to ileal perforation in association with a heavy burden of *Anoplocephala perfoliata* was diagnosed in a young entire colt which had shown pyrexia and abdominal pain prior to death.

PIGS;

Pleurisy, pericarditis, peritonitis and pneumonia due to *P. multocida* infection was diagnosed on full post mortem examination of an eighteen – week – old grower which was submitted with a history of ill-thrift. At gross post mortem examination there was evidence for severe bronchopneumonia with pleurisy, pericarditis and fibrinous peritonitis. Histologically in the lungs there was acute focal to confluent necrotising bronchopneumonia, bronchiectasis and focal fibrino-necrotic pleurisy. Moderate growths of *P. multocida* were recovered from lung tissue and IFATs for ADV (Aujeszky's), influenza virus (swine flu), PCV-2 and PRRSV on lung tissue were negative.

BIRDS: Poultry

The diagnostic analysis for poultry post mortem submissions during the quarter is given in CHART 1 on next page

Liver diseases including bacterial hepatitis and hepatic necrosis (twelve cases, 16.0 %), septicaemias (nine cases, 12.0 %), digestive disorders (seven cases, 9.0%) and musculo-skeletal disorders including tendonitis and tendon rupture (five cases, 7.0% %) predominated.

POULTRY SUBMISSION DIAGNOSTIC ANALYSIS Q1 2017

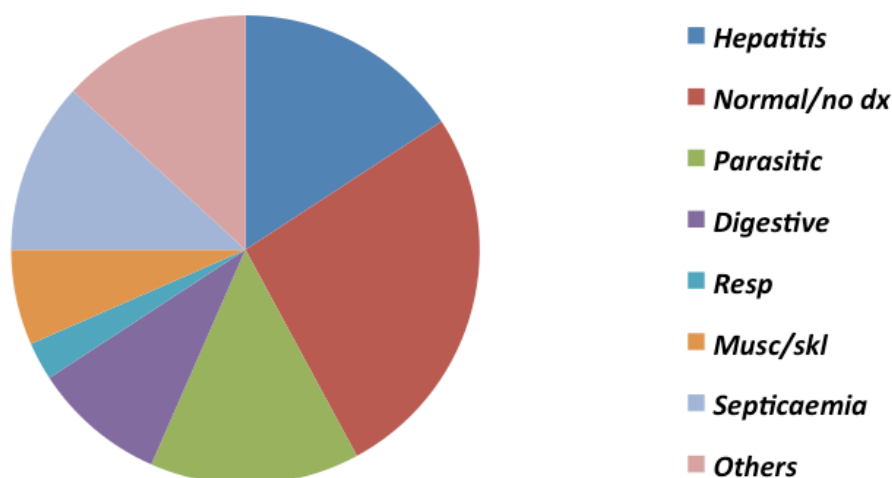


Chart 1

Poultry Diagnostic Submission Analysis

Histomonosis was diagnosed on the basis of examination of a series of fixed liver and caecal samples submitted from a flock of twenty - nine - week - old layer breeder parents. Histological examination of Periodic - acid -Schiff (PAS) stained sections was undertaken and histomonads were identified in the caecal cores, no similar structures were detected in the livers.

BIRDS: Cage and aviary

A seven - year - old Toco Toucan (*Ramphastos toco*) with a history of lameness, swollen joints and weight loss was submitted from a zoological collection. The bird had been euthanased on welfare grounds. On gross examination there was severe purulent tenosynovitis and osteoarthritis in both hocks, with infection extending along the tendon sheaths. *E. coli* and coagulase negative *Staphylococcus* sp were recovered in profuse growth from the tendon sheaths and joint swabs although given the chronic nature of the condition, their importance is speculative. In this case there was intercurrent iron storage disease with diffuse pigment accumulation within hepatocytes and special staining of the liver with Perle's reagent was positive for iron (FIGURE 4).

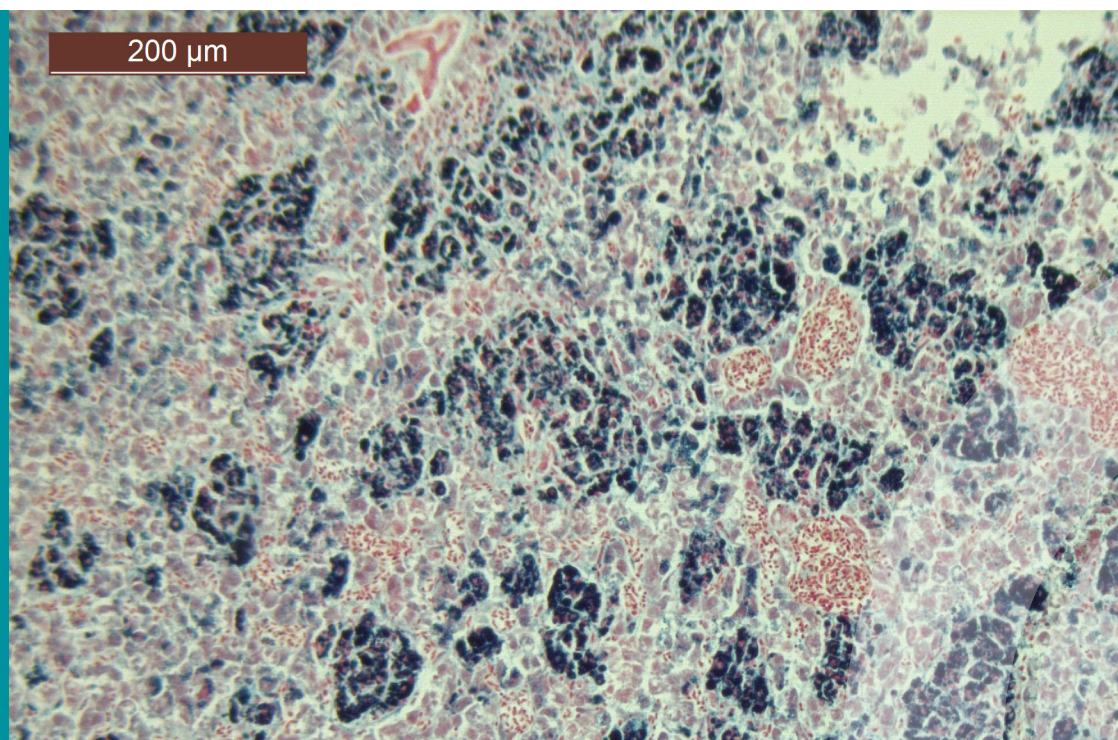


Figure 4

Iron stained by Perle's reagent in the liver of a Toco Toucan

WILDLIFE and EXOTICS:**High Pathogenicity Avian Influenza (HPAI) in wild birds**

A total of eighteen wild birds were examined for the presence of HPAI during the quarter, of these two whooper swans, one mute swan and one Chinese goose were shown to be positive for HPAI H5 N8. One mallard duck and one mute swan were shown to be positive for a low pathogenicity strain of avian influenza virus. Partial gene sequencing showed the H5 N8 virus detected in Northern Ireland to be identical to H5 N8 virus circulating in Europe during the same period.

