Surveillance
Ministry for Primary Industries reporting on New Zealand's Biosecurity Health Status

Biosecurity New Zealand
Tiakitanga Pūtaiao Aotearoa

Bovine Disease Surveillance Quarterly Report

As part of Biosecurity New Zealand's (BNZ) Animal Health Surveillance Programme, BNZ collects anonymised data on all sick bovine cases seen by the veterinary diagnostic laboratories; Gribbles, SVS and IDEXX.

This data can provide valuable information for veterinarians, both on the clinical presentations (presenting signs) and the diagnoses achieved (aetiological diagnoses), furthering understanding of disease patterns at both the regional and national level.

By using the past three years data for the same quarter, this may help veterinarians understand what diseases to expect in the same quarter of the current year, assuming similar climatic conditions. Additionally, it may assist in identifying emerging diseases in a timely way.

This endemic disease report has two parts:

1. Graphs showing presenting signs and diagnoses for the same quarter for the past three years, nationally.

   The graphics demonstrate the frequency of each presenting sign for the quarter and then, for the three most frequently reported presenting signs, the aetiological diagnoses that were achieved for each presenting sign.

2. Reproduced bovine disease narratives from *Surveillance* magazine for the quarter nationally. These narratives were submitted by commercial laboratories for the April to June period of 2021.

You can help with the quality of this data by providing a thorough history on your submission forms to the commercial laboratories.

For any queries or comments relating to this report please contact:

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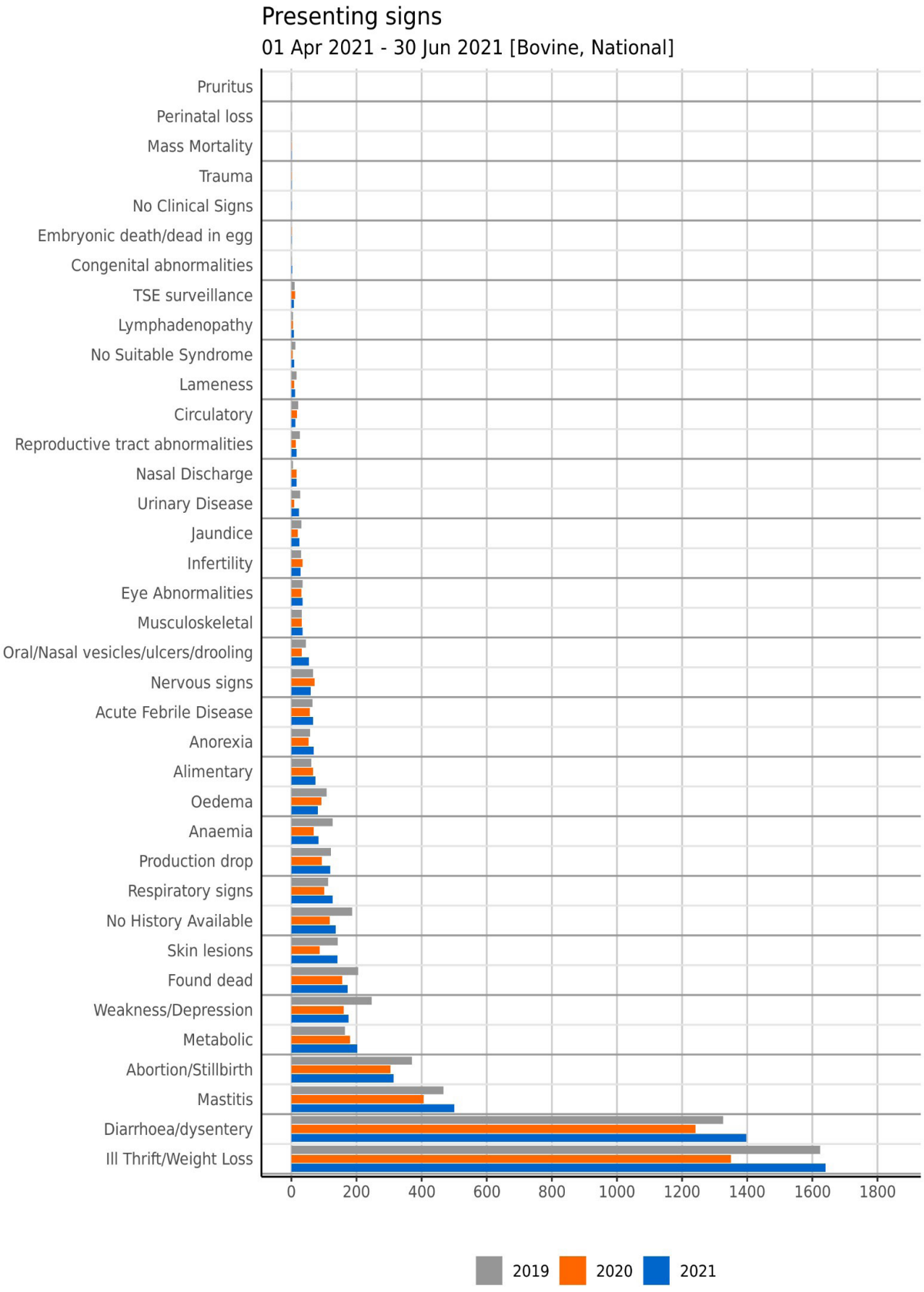
Note: Because the information contained in this report is derived from practitioners' submissions to veterinary laboratories, it will be subject to a number of biases which should be considered when interpreting the data. This can include (but not limited to); socioeconomic impacts, access to veterinary services, environmental impacts, production systems etc.

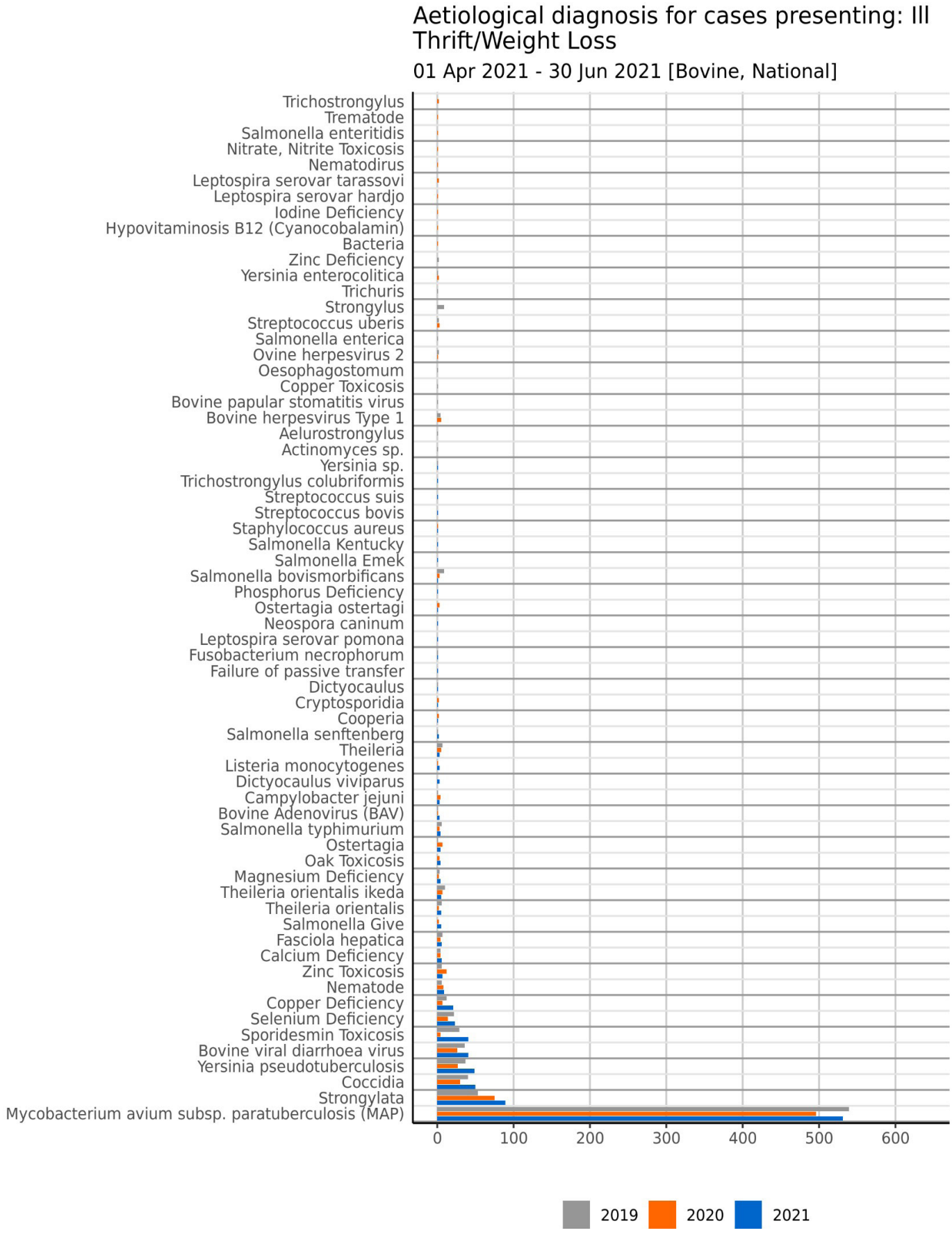
National Report

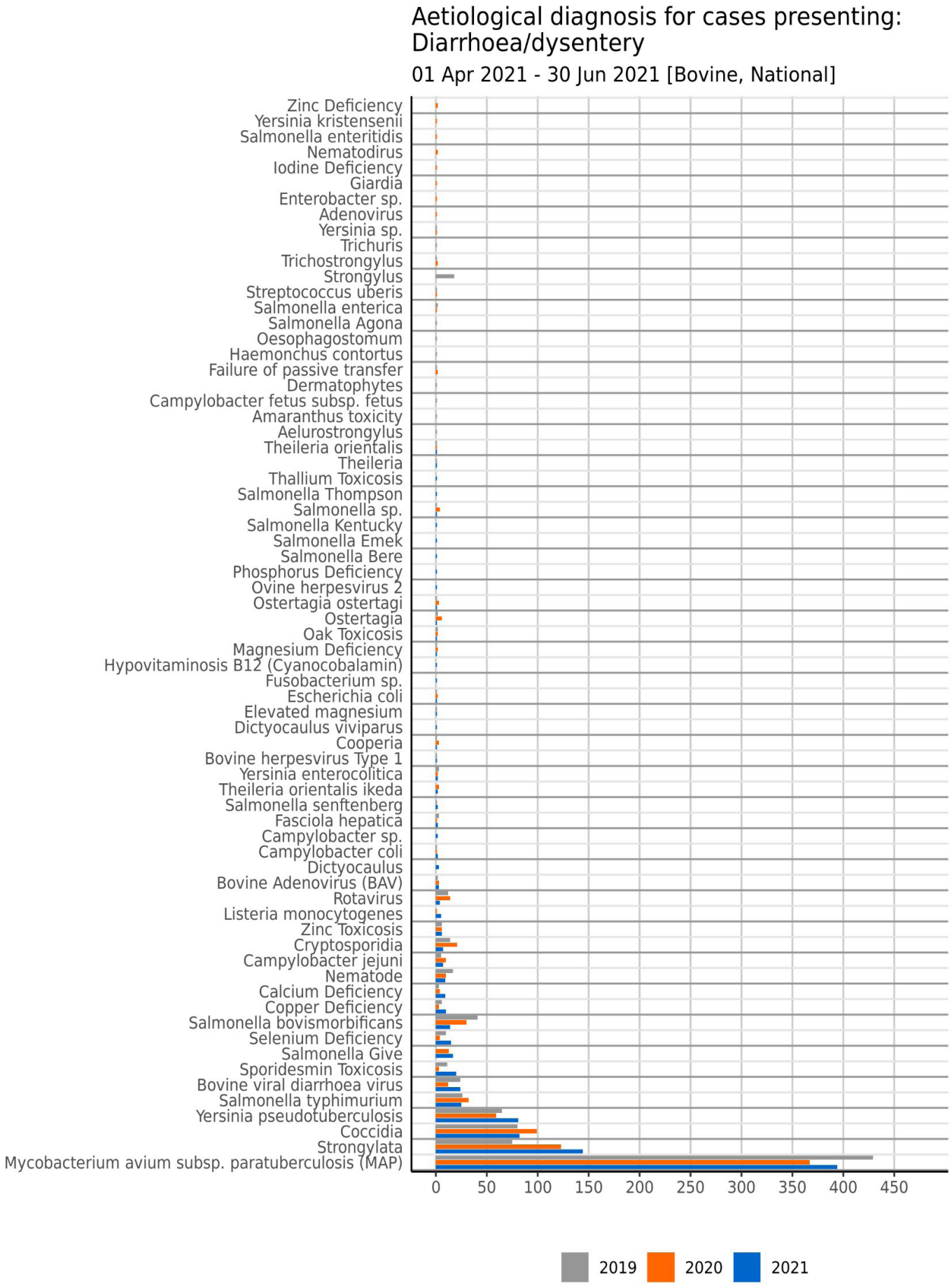
Species: Bovine

Date: April–June 2021



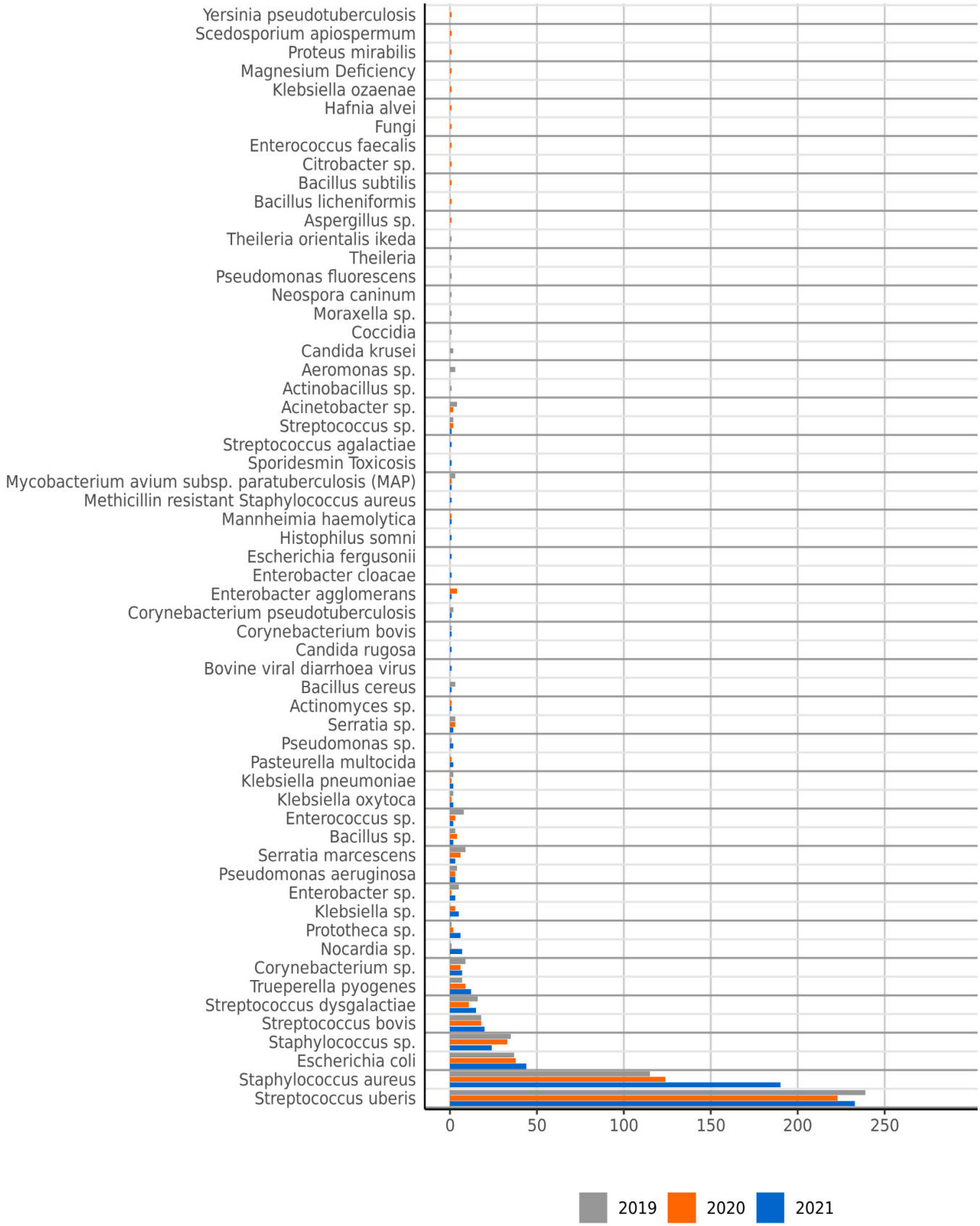
Aetiological diagnoses for 3 most frequently reported presenting syndromes:




Aetiological diagnosis for cases presenting:
Diarrhoea/dysentery
01 Apr 2021 - 30 Jun 2021 [Bovine, National]
Zinc Deficiency
Yersinia kristensenii
Salmonella enteritidis
Nematodirus
Iodine Deficiency
Giardia
Enterobacter sp.
Adenovirus
Yersinia sp.
Trichuris
Trichostrongylus
Strongylus
Streptococcus uberis
Salmonella enterica
Salmonella Agona
Oesophagostomum
Haemonchus contortus
Failure of passive transfer
Dermatophytes
Campylobacter fetus subsp. fetus
Amaranthus toxicity
Aelurostrongylus
Theileria orientalis
Theileria
Thallium Toxicosis
Salmonella Thompson
Salmonella sp.
Salmonella Kentucky
Salmonella Emek
Salmonella Bere
Phosphorus Deficiency
Ovine herpesvirus 2
Ostertagia ostertagi
Ostertagia
Oak Toxicosis
Magnesium Deficiency
Hypovitaminosis B12 (Cyanocobalamin)
Fusobacterium sp.
Escherichia coli
Elevated magnesium
Dictyocaulus viviparus
Cooperia
Bovine herpesvirus Type 1
Yersinia enterocolitica
Theileria orientalis ikeda
Salmonella senftenberg
Fasciola hepatica
Campylobacter sp.
Campylobacter coli
Dictyocaulus
Bovine Adenovirus (BAV)
Rotavirus
Listeria monocytogenes
Zinc Toxicosis
Cryptosporidia
Campylobacter jejuni
Nematode
Calcium Deficiency
Copper Deficiency
Salmonella bovismorbificans
Selenium Deficiency
Salmonella Give
Sporidesmin Toxicosis
Bovine viral diarrhoea virus
Salmonella typhimurium
Yersinia pseudotuberculosis
Coccidia
Strongylata
Mycobacterium avium subsp. paratuberculosis (MAP)
0
50
100
150
200
250
300
350
400
450
2019
2020
2021

Aetiological diagnosis for cases presenting: Mastitis

01 Apr 2021 - 30 Jun 2021 [Bovine, National]



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Quarterly diagnostic cases – national bovine disease reports

April – June 2021

Surveillance, Volume 48, Issue 3 Annual Report, pp 84-93, Sep 2021

http://www.sciquest.org.nz/node/166260

Bovine adenovirus

Sporadic outbreaks of **systemic bovine adenovirus** infection occurred in rising-1-year-old cattle during autumn. In one case, three of 100 dairy heifer calves on a Bay of Plenty property died and 10 became ill. Necropsy of one calf revealed mucoid intestinal and rectal contents and severe reddening and oedema of the abomasum, small intestine and colon. Arsenic toxicity was suspected, based on clinical presentation, but liver arsenic levels were below the detectable limit (< 0.04 mg/kg). Histological examination revealed characteristic haemorrhagic and necrotising lesions throughout the gastrointestinal tract, accompanied by basophilic endothelial intranuclear inclusions. Similar inclusion bodies were observed in the kidney and spleen.

A further case was diagnosed when a 10-month-old Jersey heifer on a Taranaki property died suddenly in a paddock where six calves had died similarly over the previous 3 years. Heart, kidney and spleen samples were submitted for histological examination, and characteristic interstitial nephritis and adenoviral vascular inclusion bodies were observed in the kidney.

An 8-month-old Friesian beef bull on a Northland property died suddenly. Watery faeces were noted at necropsy. Histopathological examination of multiple fixed tissues revealed amphophilic intranuclear inclusion bodies in the endothelial cells of the kidney, lymph node and intestine, consistent with **bovine adenovirus infection**. This virus can cause acute diarrhoea and death in calves, typically causing death in spring-born calves during the following autumn or winter.

Sudden death of eight 9-month-old calves in a mob of 300 occurred on a Waikato dairy property. An on-farm necropsy was performed and fixed tissues submitted for histopathology. Within the ileal sections, submucosal vascular endothelial cells showed intranuclear inclusion bodies consistent with **bovine adenoviral infection**. In addition, liver sections showed portal fibrosis and biliary hyperplasia consistent with **sporidesmin toxicity**.

Acorn poisoning

Eight of a group of 24 nine-month-old calves on a South Canterbury farm died suddenly. On histological examination the tissues from one calf had lesions of toxic renal cortical tubular injury, consistent with **acorn poisoning**. The calves had grazed among acorns more than a week before the first deaths occurred. This case was unusual because the animals were not noticed to be sick, even though they were located close to the farmhouse. This was one of several cases of acorn poisoning seen in Canterbury this autumn.

In April, a veterinarian was called to examine a group of 20 eight-month-old Angus cross calves on a King Country farm. The calves had been doing well until the previous week, when one was found dead. Two further deaths occurred the day before the veterinarian visited the property. The animals had a history of access to acorns, and large quantities of acorn remnants were seen in the faeces. During post-mortem examination of the two most recently dead calves, petechial haemorrhages were noted throughout the carcass of one animal, which also had oedema around the kidneys. The second calf had no obvious abnormalities at necropsy. Multiple fixed tissues were submitted to the laboratory for histopathological examination, along with blood samples from a third, live calf that appeared very ill-thrifty. Serum biochemistry of the live calf revealed marked azotaemia (creatinine 1,037 µmol/L; reference range 39–181) with severe hyponatraemia (sodium 116 mmol/L; reference range 136–146), hypochloraemia (chloride 64 mmol/L; reference range 90–104), mild hypokalaemia (potassium 3.2 mmol/L; reference range 3.9–5.9) mildly increased liver enzymes (GGT 61 IU/L; reference range 3–47) and elevated GLDH (109 IU/L; reference range 3–35). The degree of azotaemia was consistent with renal failure, which was likely due to **acorn toxicity**. Marked hypocalcaemia (calcium concentration 0.8 mmol/L; reference range 2–2.7), which has been reported

with acorn toxicity, was also noted. Marked nephrosis characterised by multifocal tubular necrosis and degeneration was detected on histopathological examination of the kidneys of both calves that died, further supporting the diagnosis.

Six out of 30 rising-1-year-old beef calves on a Bay of Plenty farm died and three others were lethargic with ventral oedema. The calves had recently been moved to a paddock with oak trees, mature ryegrass, paspalum and clover. On clinical examination the affected calves displayed dyspnoea and some had diarrhoea and dehydration. One died during examination. Necropsy revealed haemorrhagic contents within the abomasum, jejunum and colon. Blood and tissue samples were collected for laboratory evaluation. The most remarkable findings were marked azotaemia and hypophosphataemia, with creatinine 1,511 µmol/L (reference range 39–181), urea 85.4 mmol/L (reference range 2.7–11.9) and phosphate 4.10 mmol/L (reference range 1.3–3.3). Bacterial culture of faeces was negative for *Salmonella* and *Yersinia* species. Bovine viral diarrhoea (BVD) virus was not detected by PCR on a sample of spleen. Histological examination revealed severe diffuse tubular necrosis, degeneration and regeneration compatible with a toxic insult. Given the grazing environment, **acorn toxicity** was diagnosed.

Four cows in Hawke's Bay were found dead over a 48-hour period. They presented clinically with melena, and on post-mortem examination had thickened abomasums and pale, mottled kidneys. Serum was submitted from two affected but alive animals and fixed tissues were submitted from an animal that was found dead. Serum changes were consistent with azotaemia, with elevated creatinine (685 and 841 umol/L; reference range 55–130) and urea (36.1 and 52.2 mmol/L; reference range 2.7–12.3). Renal histopathology showed that more than half of the cortical and medullary tubular epithelium had tubular necrosis and tubular ectasia with attenuation or (rarely) intracytoplasmic globules of intensely eosinophilic material (hyaline droplets). Affected tubular lumina were often mildly ectatic and had tubular proteinosis and sloughed tubular epithelial ghost cells. As the cattle had had access to acorns 2 weeks before the onset of clinical signs an aetiologic diagnosis of **acorn toxicosis** was made. While pigweed (*Amaranthus*) toxicity would be a differential, the cattle did not have any known access to this plant.

Salmonella

Samples were received from a mid- Canterbury farm that experienced abortions in 12 cows out of a group of 700 over a period of 2 weeks. Histopathological examination of fixed placenta revealed marked bacterial proliferation within the capillaries and stroma of the fetal villi. The bacteria were small gram-negative rods and *Salmonella* Brandenburg infection was strongly suspected. The following day there was another submission that included fresh and fixed tissues from an aborted calf. There were no histological lesions but plentiful bacteria were seen in many of the fixed tissues, which were markedly autolysed and putrid. *Salmonella* Brandenburg was isolated on bacterial culture from the stomach contents of this fetus, supporting a diagnosis of ***Salmonella* Brandenburg abortion**.

Three 6-week-old Jersey calves from Northland had a bloody scour. Bacterial culture of faecal samples yielded a growth of ***Salmonella* Thompson** from two calves and light to heavy numbers of coccidial oocysts, consistent with concomitant **salmonellosis and coccidiosis**. *Salmonella* Thompson is an uncommon serotype in New Zealand. No bovine cases were recorded in 2020 but there were 15 cases in humans and one case in a dog. However, it is very likely to have been a significant contributing cause in this case.

In late May, 10 out of a mob of 28 three-week-old calves from Northland presented with haemorrhagic diarrhoea. Some of these animals were also pyrexic and six died. A faecal antigen test was positive for ***Cryptosporidium*** and a pooled faecal culture isolated ***Salmonella* Typhimurium**.

Malignant catarrhal fever

A 2-year-old Wagyu heifer from a herd of 200 on a property in South Canterbury had nasal erosions and a temperature of 40.1oC (normal range 37.8–39.2). A sample of whole blood with EDTA anticoagulant was submitted to the laboratory for malignant catarrhal fever (MCF) testing by PCR. MCF viral material was detected, supporting a diagnosis of **malignant catarrhal fever**, a systemic viral infection caused by sheep-associated **ovine herpesvirus-2**, which affects cattle, deer and swamp buffalo.

An 18-month-old American bison (*Bison bison*) of unspecified sex had an acute onset of haemorrhagic diarrhoea and soon died. Necropsy revealed petechial haemorrhages in the subcutaneous tissues, pericardium and skeletal muscles, and there was ulceration of the mucosa of the rumen, reticulum and omasum. Bacterial culture of a faecal sample yielded no growth of *Salmonella* or *Yersinia*. However, malignant catarrhal fever (MCF) virus was detected in a sample of heart blood tested by PCR, supporting a diagnosis of **malignant catarrhal fever**, a systemic viral infection caused by **ovine herpesvirus-2 (OHV-2)**, which has been reported to cause disease in cattle, deer, buffalo and bison.

A rising-1-year-old Friesian heifer died suddenly on a Manawatū farm. Necropsy findings included a markedly congested large intestine with blood clots and haemorrhage within the lumen. Clostridial disease was suspected as this group of animals was unvaccinated. Histological examination of multiple fixed tissue samples revealed widespread lymphohistiocytic vasculitis in multiple organs including the large intestine. The lesions were characteristic of **malignant catarrhal fever**. In cattle, MCF more commonly presents as the head-and-eye form but occasional cases present with peracute haemorrhagic enterocolitis.

A 5-year-old dairy cow on a Southland property was found recumbent and in convulsions. It died shortly afterwards. Samples of eye fluid showed normal concentrations of magnesium and calcium. Necropsy revealed only a large amount of blood in the lumen of the colon. Histopathological examination of sections of the colon showed severe submucosal oedema, necrotic ganglia and thrombosed arterioles that often had large perivascular infiltrates of mononuclear cells. There was necrosis of crypt lining cells and replacement of large areas of the mucosa by sheets of lymphoid cells. These findings were consistent with **malignant catarrhal fever**. Later examination of the fixed brain revealed additional typical lesions that confirmed this diagnosis.

Trace element

Eight 10-month-old beef calves from a group of 60 on a North Waikato farm were examined by a veterinarian after the farmer noticed that they were not doing well. The calves had previously been growing well. After initial GGT serum testing ruled out facial eczema and faecal egg counts suggested that parasite burdens were low, serum copper and selenium concentrations were measured in six calves. The mean selenium concentration was 146 nmol/L (adequate range 140–2,000), with two of the calves being in the deficient range (below 140 nmol/L). Serum copper ranged from 3 to 4 µmol/L, with a mean concentration of 3.5 µmol/L (adequate range 7–20). This confirmed **copper deficiency** as a cause of the ill-thrift, while the marginal selenium status may also have been a contributory factor.

Two 3-year-old Friesian cows from a group of 210 on one Northland property, and about 20 Friesian cross cows aged 2–3 years from a group of 850 on another nearby property owned by the same farmer, all had an abnormal hindlimb gait suggestive of bilateral hindlimb arthritis. Serum chemistry panels and haematology profiles in a selection of five cattle showed nothing significant. However, serum trace-element testing on nine animals from the first group and 11 from the other, showed uniformly low serum copper concentrations (1–5 µmol/L; adequate range 7–20), consistent with **copper deficiency**. Musculoskeletal and neurological abnormalities can be associated with copper deficiency, but generally not in adult cattle.

A mob of 9-month-old Ayrshire dairy heifers in Auckland presented with rough coats. Serum copper levels in the group were generally low (6.5–7.9 umol/L; adequate range 8–20). Copper has important physiological roles in the development of connective tissue as well as immune function and erythropoiesis. Deficiency can occur directly as a result of low copper intake, or indirectly owing to intake of copper antagonists such as molybdenum, sulphur, iron and zinc.

Mastitis

A mature dairy cow from a property in South Waikato was examined by a veterinarian when it was noticed that an abscess had developed in her udder. The cow had previously had mastitis in the same quarter. A sample of purulent material from the abscess was submitted to the laboratory for bacterial culture and yielded a heavy growth of ***Trueperella pyogenes***. This organism is most often introduced into the udder through wounds or damage to the teat ends (for example through the use of cannulas). It can also cause outbreaks of "summer mastitis" in heifers, which flies are believed to play a role in transmitting. **Mammary abscessation** is a common sequel to this infection and often results in the loss of the quarter.

S-methyl cysteine sulphoxide (SMCO) toxicity

On a property in Hawke's Bay, several in-calf heifers in a group of unspecified size were noticed to be staggering, and clinical examination revealed anaemia and jaundice. They had been grazing on a kale crop for 4 weeks. Blood samples were collected from three animals and sent to the laboratory. Haematological testing demonstrated haematocrits of 0.17–0.20 in these animals (reference range 0.24–0.46), confirming anaemia. Large numbers of Heinz bodies and erythrocyte "ghosts" were seen on the blood films from all three animals and a few *Theileria* sp. organisms were seen on the blood films of two. However, given the history of grazing on kale, **S-methyl cysteine sulphoxide (SMCO) toxicity** was suspected to be the main cause of the Heinz body anaemia. SMCO is present in all brassicas, but particularly in kale. It is converted in the rumen to dimethyl sulphide, which oxidises erythrocyte cell membranes, resulting in anaemia.

Lymphoid leukaemia

An adult Jersey cow in Northland due to calve in 2 weeks was mildly pyrexic (temperature 39.6°C) and had a large, swollen udder and pitting oedema of the ventral mandible and sternum regions. Haematological examination showed anaemia, with RBC 3.9 x 1012/L (reference range 5–7.7 x 1012), haemoglobin 62 g/L (reference range 85–130), haematocrit 0.19 (reference range 0.24–0.40) and a marked leucocytosis that was mainly attributable to a lymphocytosis of 102.9 x 109/L (reference range 1–5.8 x 109). The lymphocytes were mainly small, with some intermediate to large cells. These findings were consistent with a diagnosis of **lymphoid leukaemia**.

Mycotic abomasitis

Several yearling Jersey bulls on a Franklin farm developed lethargy and weight loss. Necropsy of one of the more severely affected bulls revealed multiple ulcers in the abomasum. Faecal samples from several animals all tested negative for FEC, coccidiosis, yersiniosis and salmonellosis. Multiple fixed tissue samples were submitted for histological examination. The most significant changes were ulcerative and necrotising lesions within the abomasal mucosa. Affected areas, including underlying blood vessels, were deeply infiltrated by branching fungal hyphae, confirming a diagnosis of **mycotic abomasitis**. Fungal infections of the alimentary tract in cattle occur primarily as a result of feeding contaminated silage or are secondary to other causes such as trauma, parasitism, BVD infection, toxic insult or parasite challenge. Copper deficiency, identified by testing other animals on the property, may have contributed to ill-thrift and reduced immunity in these bulls.

Parasitism

Two out of 20 Friesian bulls on a Waikato property developed extreme weight loss and diarrhoea necessitating euthanasia. A complete set of tissues was collected and fixed for histological examination. The most significant lesions were in the abomasum, where the mucosa was diffusely nodular and hyperplastic with mucus neck cell metaplasia and loss of parietal cells. Occasional nematode larvae with ridged cuticles were visible within the glands. Bacterial culture of a faecal sample was negative for *Salmonella*, *Yersinia* and *Listeria* species. The final diagnosis was chronic **abomasal ostertagiasis**.

A mob of 6-month-old Friesian bull calves in South Waikato were off-colour and wasting; two had diarrhoea. The calves were due to be drenched; faecal egg counts in one calf were markedly increased to 2,450 strongyle eggs/g, confirming **parasitic gastroenteritis**. In addition, serum selenium in two calves was low, at 140 and 80 nmol/L (adequate range 150 –3,500), confirming concurrent **selenium deficiency**. Selenium is important for optimal immune functions via several mechanisms including reduction of oxidative stress, anti-inflammatory effects and effects on white blood cell function.

Hypersensitivity reaction

A dairy heifer in Manawatū presented with chronic rhinitis, which showed some improvement with antihistamines, anti-inflammatories and oxytetracycline. Histopathology of nasal mucosal biopsies revealed a mixed eosinophilic/suppurative rhinitis suggesting an underlying hypersensitivity reaction with probable secondary bacterial infection.

Johne's disease

Eight cows recently dried off on a Matamata-Piako dairy farm showed gradual signs of weight loss without evidence of diarrhoea. The farm had a previous history of **Johne's disease** and **BVD** several years previously. Tests on serum samples showed that several cows had low selenium at 80 to 130 nmol/L (adequate range 150–3,500) There was low copper in one cow (7.3 umol/L; reference range 8–20) and markedly increased GGT in four (1,272–2,048 IU/L; reference range 0–35), indicating extensive biliary epithelial damage consistent (at this time of year) with **sporidesmin toxicity**. In addition, several cows had hypomagnesaemia at 0.29 to 0.48 IU/L (reference range 0.62-1.15) which, in the absence of typical signs of tetany, was considered likely to be related to hypoalbuminaemia, although albumin was not tested. Serology tests showed three cows with a positive Johne's ELISA test, confirming **Johne's disease**. This case highlights the insidious onset of Johne's disease, with malabsorptive effects causing production losses before the onset of diarrhoea. In addition, concurrent disease is likely to influence the onset of clinical paratuberculosis (Garcia et al 2015).

Superphosphate toxicity

A group of 18-month-old crossbred beef bulls in Waikato presented with scouring and wasting; one bull died. Bovine viral diarrhoea (BVD)/mucosal disease was suspected. However, necropsy tissues submitted revealed a severe nephrosis, pulmonary emphysema, severe necrotising oesophagitis and vacuolar hepatopathy. The nephrosis was suggestive of renal toxicity and **superphosphate toxicity** was suspected. Oesophagitis was likely related to the consequent uremia, with secondary invasion by fusiform bacteria.

Facial eczema

Facial eczema cases extended into late autumn in the upper North Island; five dairy heifers in a mob of 160 that had been grazing drain banks on a Matamata-Piako property presented with peeling skin, swollen legs and ventral abdominal oedema. Serum GGT levels were severely increased at 1,529 IU/L (reference range 0–36). Serum zinc levels had dropped below prophylactic levels, ranging from 6.8 umol/L (deficient; normal range 11–20) to 15.9 umol/L (below the prophylactic level for facial eczema, 20–35), related to the activity period of the zinc bolus administered earlier in the season.

Abortion

Several cases of bovine abortion were investigated during the quarter. On a dairy property in Hauraki, an abortion storm occurred involving 19 cows (from both the milking herd and dry mob). The farm had suffered a high incidence of facial eczema in March. Five out of eight serum samples from the affected cows were positive on ELISA for **Neospora**. A positive *Neospora* ELISA result within 3 weeks of fetal loss is considered strong evidence that recent *Neospora* infection or reactivation of latent *Neospora* infection is the cause of abortion. GGT levels were only mildly increased, indicating only mild active biliary epithelial damage, but there was likely to have been previous or chronic biliary damage from the recent facial eczema. Abortions related to *Neospora* are often multifactorial and an underlying stress factor such as facial eczema may trigger activation of the latent *Neospora*.

In another **Neospora** abortion outbreak, six dairy cows on a Matamata-Piako property aborted within 1 week, and one of them was markedly sick. Five of the cows tested positive on *Neospora* serology via ELISA.

A case of dairy heifer abortion on an Ashburton property was investigated and fetal and placental samples submitted. Histopathology revealed a suppurative placentitis with cotyledonary necrosis and submucosal vascular thrombi; in the fetal lung there were intrabronchial bacterial cocci. Cultures of fetal stomach contents yielded a moderate growth of ***Staphylococcus aureus***, supporting a diagnosis of abortion following **bacterial placentitis**. This is likely to represent one of the diverse group of bacteria that can cause sporadic abortion following opportunistic infection. These bacteria are not contagious reproductive pathogens but commonly found in the environment or mucous membranes.

Two separate farms were experiencing bovine **abortions**. These two cases exemplify the importance of submitting the placenta for histology and culture. One case was from Western Bay of Plenty, where there had been several abortions in the week prior to submitting samples. Serology and placentas from two cows were submitted. Serology in one cow was negative for ***Neospora caninum*** but the other cow was positive. Unfortunately, brain was not submitted to look for evidence of *Neospora* abortion in the fetuses. However, both placentas had bacteria present in cotyledonary trophoblasts, admixed with scattered degenerate neutrophils and necrosis. No culture was requested in either case.

The second farm was in Waikato, and fixed placenta, brain and other tissues were submitted after the cow was found to be seronegative for *N. caninum*. Histological changes were similar to those described above. There was histological evidence of intravascular bacterial proliferation, which was suggestive of fetal sepsis. For both cases a diagnosis of **bacterial placentitis** was made. Culture was not requested. As some bacteria that cause bovine abortions are zoonotic, results from culture provide important information.

Leptospirosis

A mob of 60 calves (age unknown) from South Waikato presented with severe ill-thrift. Serum and faecal samples were collected and three animals were euthanased for post-mortem examination. Serum biochemistry revealed mild hypochloraemia in all five animals tested (87–91 mmol/L; reference range 96–104) and mild increases in GLDH in three animals (79–414 U/L; reference range 8–41). Faecal egg counts revealed low numbers of coccidia in five of 10 individual faecal samples. Faecal culture for *Salmonella* and *Yersinia* on 10 samples was negative. Histology on tissues from the three necropsies revealed lymphoplasmacytic tubulointerstitial nephritis with tubular necrosis and regeneration. A Warthin-Starry

stain revealed tangled mats of argentophilic bacteria consistent with *Leptospira* sp. MAT from 10 animals revealed titres for **Leptospira Pomona** of 1:400 (one animal), 1:800 (six) and 1:1,600 (three). Titres for *Leptospira hardjo* ranged from negative to 1:100, which could be due to cross-reactivity. Titres less than 1:100 are considered negative, while > 1:100 is considered positive. Vaccination typically results in low titres (< 1:400) but higher titres (up to 1:3,200) are occasionally seen. **Leptospirosis** in calves can present with fever, haemoglobinuria or jaundice, although many infections are subclinical. The vaccination history of these animals was not provided.

Metabolic

In mid-April, a group of autumn-calving cows from Waikato presented with lethargy. Serum biochemistry revealed elevated BOH levels in five of six animals tested, varying from 2.04 to 6.46 mmol/L (reference range 0.2–1.0). Calcium, magnesium, GGT and zinc levels were normal. This is consistent with **negative energy balance and ketosis**. This is most commonly seen in early lactation but can occur in late gestation and results in inappetence and neurological signs.

Zinc toxicity

In mid-April, a rising-2-year-old heifer was examined for scouring and loss of body condition. The mucous membranes were pale. A faecal egg count was negative. The CBC revealed a moderate non-regenerative anaemia with a haematocrit of 0.18 (reference range 0.26–0.48) and a neutrophilia of 9.3 x 109/L (reference range 1.0–4.6 x 109). Occasional ***Theileria*** organisms were present on the blood smear. Biochemistry revealed a decrease in total proteins (48 g/L; reference range 60–86), albumin (19 g/L; reference range 25–40) and globulins (29 g/L; reference range 31–54). The serum zinc level was high (89 umol/L; facial eczema protective range 20–35), consistent with **zinc toxicity**. The amylase level was low (14 U/L; preliminary reference range 22–31), which suggested pancreatic damage secondary to zinc toxicity. It is unclear in this case whether the anaemia was due to blood loss or haemolysis caused by either zinc toxicity or *Theileria* sp.

Yersinia

In early June, an 8-month-old ill-thrifty calf was found recumbent with profuse diarrhoea and dehydration. A heavy growth of ***Yersinia pseudotuberculosis*** was found on faecal culture.

Garcia AB, Shalloo L (2015). Invited review: The economic impact and control of paratuberculosis in cattle. J. Dairy Sci. 98, 1–21.

The veterinarians in Biosecurity New Zealand's Incursion Investigation team investigate suspected cases of emerging or exotic diseases in New Zealand. They are interested in hearing about any cattle health issues that seem out of the ordinary.

The following may indicate an emerging, or even exotic disease:

- an unusual number of sick or lame animals
- animals with unusual clinical signs
- sick animals not responding to standard treatment
- an unexpected drop in production
- unexpectedly poor reproductive performance.

To report suspected exotic land, freshwater and marine pests, or exotic diseases in plants or animals, call:

0800 80 99 66

Biosecurity New Zealand
Ministry for Primary Industries
Manatū Ahu Matua

If you suspect you've seen an exotic or emerging disease, please phone Biosecurity New Zealand on **0800 80 99 66** to speak to one of our veterinarians as soon as reasonably practical.