

Surveillance



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Reports from New Zealand Food Safety Authority

Quarterly review of diagnostic cases – April to June 2006

Quarterly report of investigations of suspected exotic diseases

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Reports from New Zealand Food Safety Authority



National Chemical Residue Programme 2004/2005

NZFA operates a National Chemical Residue Programme. This is a statistical risk-based residue programme that randomly samples animal products at the point of harvest.

The programme is designed to determine compliance with Good Agricultural Practice (GAP) by:

- assessing the effectiveness of New Zealand controls and practices that ensure that the chemical residue status of slaughtered animals, and the food products from animals intended for consumption, are safe and comply with regulatory residue thresholds;
- identifying if, when and why industry/national controls and practices have failed to provide the required conformance and then to ensure that appropriate corrective procedures are implemented;
- identifying the non-complying occurrence of contaminants or presence of agricultural compounds in animal products and removing any affected product from the human food chain;
- implementing traceback and investigative procedures to identify the cause of the non-complying residues and contaminants using Geographical Information Systems (GIS);
- allowing for the intensive surveillance testing of at-risk animals or product to eliminate future residue non-compliances from the identified risk source.

Sampling years for each programme differ according to the industry activity.

Programme period	Report period
1 October 2004 – 30 June 2005	1 July 2004 – 30 June 2005
Red meat (cattle, sheep, deer, pigs, goats, horses)	Honey
Ostriches and emus	Broilers
	Aquaculture
Bobby calf (1 February 2005 – December 31 2005)	Dairy

NB. The programme periods are different for different animal types/products as NZFA was moving to a standard July-June programme period during this time.

All chemical residue analysis performed on samples submitted under the National Chemical Residue Programme (NCRP) must be undertaken by NZFA-approved laboratories, using approved methods that have been fully validated.

Programme content

The content of the residue programme includes all classes and species of cattle, sheep, deer, pigs, goats, horses, wild animals, broilers, ostriches and emus, honey and farmed salmon.

The Dairy National Chemical Contaminants Programme (NCCP) monitors raw milk and colostrum at the farm prior to consolidation and dilution, through to transportation and processing.

Analysis of a wide range of contaminants and agricultural compounds is included in the NCRP and the NCCP.

Compound classes tested are:

- antibacterial and antibiotic substances (eg aminoglycosides, beta-lactams, cephalosporins, tetracyclines, sulphonamides);
- anthelmintics (eg benzimidazoles, levamisole, macrocyclic lactones);
- banned or restricted substances (eg steroids, stilbenes, resorcylic acid lactones, nitrofurans);
- anticoccidials (eg lasalocid, semduramycin, narasin, salinomycin, monensin, nicarbazin, amprolium, carbadox, dimetridazole);
- synthetic pyrethroids and carbamates (eg cyfluthrin, cyhalothrin, cypermethrin, deltamethrin, flumethrin, permethrin, fenvalerate, propoxur, propham, primicarb, methomyl, methiocarb, chlorpropham, carbofuran, carbaryl, bendiocarb);
- organochlorines (eg DDT and metabolites, α + β hexachlorocyclohexane [HCH], lindane, hexachlorobenzene [HCB], dieldrin, aldrin, heptachlor, heptachlor epoxide, polychlorinated biphenyls [PCBs], oxychlordan, endosulphan sulphate);
- organophosphates (eg chlorfenvinphos, famphur, diazinon, fenthion, malathion, dichlorfenthion, phosmet, coumaphos, temephos, propetamphos, tetrachlorvinphos, dichlorvos, chlorpyrifos, trichlorphon);
- vertebrate poisons (eg 1080, brodifacoum, flucoumafen);
- heavy metals;
- radionuclides;
- aflatoxins.

Programme results

Five samples of meat from farmed mammals had test results that showed residues were above the MPL* (maximum permissible level). These animals were:

- one bobby calf – blood test positive for sulphonamide

Monitoring programme results 2004 – 2005				
Primary product group	Number of samples	Number of sample-compound combinations ²	Number of samples with detections above the NZ threshold	% of samples that contained no detectable residues ³
Farmed mammals	4,713	17,798	5	98.91 %
Ostriches and emus	98	11,862	0	98.31 %
Honey	16	1,902	0	100 %
Farmed salmon	3	34	0	100 %
Broilers	52	4,702	0	97.78 %
<i>Trichinella</i> ¹	485	485	0	100 %
Raw milk and colostrum (NCCP)	368	74,160	0	99.88%

¹ for farmed pigs

² the overall number of sample-compound combinations is not precise as some procedures can test for many different compounds

³the commonest residue detected was DDE at low parts per billion from historical use of DDT.

(antibacterial compound) above MPL. This was detected by a veterinarian and the meat did not enter the food chain;

- one ewe – liver test showed fenbendazole (anthelmintic) levels above the MPL;
- one beef cow – liver test showed abamectin (anthelmintic) levels above the MPL;
- one pig – liver test showed endosulphan (organochlorine) levels above the MPL;
- one horse – fat test showed moxidectin (anthelmintic) levels above the MPL.

* MPLs are action limits set under the Animal Products Act (APA) and are used as triggers to ensure that exported animal products meet market access requirements (including the New Zealand market).

Regulatory action is required to be taken on products that exceed the MPL although the actions may be quite different in different cases.

In the first four cases cited above, the supplier (farmer) was placed on a surveillance list and subject to enhanced sampling. The farmer remained there until NZFSA was satisfied they supplied conforming product.

Trichinella spiralis testing was undertaken on 485 samples of farmed pig meat and 1,720 samples of (exported) horse meat. None of the samples contained the parasite. No wild pigs were submitted for testing as none were supplied for processing.

Fish heavy metal test summary

Fish is not subject to a monitoring and ML compliance programme as such. Under the Food Standards Code (FSC) the ML (the contaminant terminology used in the Food Standards Code) applies to aggregate lots of fish (and is similarly specified under the APA). Fish not sampled in this way has a default ML of 1 mg/kg for mercury.

NZFSA's monitoring programme measures the contaminant on a single fish to gain greater information on the variance of the contaminant level. The tables report the results for lead and mercury, the only two contaminants measured. The data are used to provide information to fishing companies on suitable fish for harvest both by type, size (age) and region.

Mercury levels in fish July 2004 – June 2005					
Species	No. tests	ML(1)-FSC 1.4.1 clause 6	No.>ML(1)	ML(2)-FSC 1.4.1 NOT clause 6	No.>ML(2)
Albacore tuna	30	0.5 mg/kg	0	1.0 mg/kg	0
Broadbill swordfish	65	1.0 mg/kg	5	1.0 mg/kg	5
Cardinal fish	60	0.5 mg/kg	60	1.0 mg/kg	55
Hapuku	10	0.5 mg/kg	2	1.0 mg/kg	0
Ling	65	0.5 mg/kg	16	1.0 mg/kg	0
Total samples	230	0.5 mg/kg	81	1.0 mg/kg	60

Lead levels in fish July 2004 – June 2005			
Species	No. tests	ML FSC 1.4.1 clause 6	No.>ML
Albacore tuna	30	0.5 mg/kg	0
Broadbill swordfish	65	0.5 mg/kg	1
Cardinal fish	60	0.5 mg/kg	0
Total samples	155	0.5 mg/kg	1

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Bovine cysticercosis

Suspect *Cysticercus bovis* lesions are submitted to one specific animal diagnostic laboratory approved by MAF for the diagnosis of bovine cysticercosis.

In 2005 there were 16 submissions with only 1 (6%) lesion showing signs of identifiable cestode material.

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Quarterly review of diagnostic cases – April to June 2006

Gribbles Veterinary Pathology

Cattle

Diarrhoea in mobs of calves in Taranaki was investigated by bacterial culture of faecal samples, parasitology and serology. In cases without evidence of parasitism or viral enteritis *Yersinia pseudotuberculosis* was sometimes isolated, confirming a diagnosis of **yersiniosis**.

Many cases of illthrift in young cattle were reported to the Palmerston North laboratory. A number of aetiologies need to be investigated to reach a diagnosis. In one case in the Hawke's Bay an entire mob of 117 mixed breed eight-month-old heifers was examined because of a history of diarrhoea and illthrift, despite recent drenching. There was no evidence of coccidiosis or gastrointestinal parasitism. A mean serum selenium concentration of 91 nmol/l (range 78-100; normal 140-1000) was consistent with a diagnosis of **selenium deficiency**. Diarrhoea in selenium deficient herds is believed to be associated with retarded vitamin E absorption, but the pathogenesis is not elucidated.

Many cases of severe **parasitism** have been diagnosed this autumn. In one case in the Manawatu, five heifer calves from a mob of 120 died. Body condition in the rest of the mob was described as 'atrocious' with severe diarrhoea. The last anthelmintic treatment was administered six weeks previously. Postmortem of one heifer revealed marked ulceration and inflammation of the abomasum alternating with raised round nodules. Histologically the nodules were seen to contain large numbers of coiled nematodes, either associated with necrosis or emerging into the lumen, consistent with a diagnosis of type II ostertagiasis. Similar changes associated with nematode larvae were visible in the small intestine. In a separate case from Hawke's Bay, faecal egg counts ranging from 1,550 to 30,000 eggs per gram were recorded in Friesian bull calves.

In late autumn there were a number of outbreaks of gastrointestinal **parasitism** in both beef and dairy calves in Otago-Southland. In one outbreak, four of 20 rising one-year-old beef calves running with older cattle died after a short period of diarrhoea. Necropsy of one calf revealed signs consistent with ostertagiasis, and an abomasal worm count revealed a staggering 237,000 *Ostertagia* spp. Most were immature, which might explain why the egg count on faeces from this calf was only 1,090 epg. The spleen from this calf was also positive for BVD virus antigen. In another outbreak, eight of a mob of 100 nine-month-old Friesian heifers grazing on a run-off were found dead and 80 were off-colour with diarrhoea. All calves had been treated with a pour-on levamisole formulation some two weeks previously. Faecal egg counts from a number of faecal samples collected from the paddock ranged from 50-7,850, and a total worm

Each quarter, Surveillance publishes a review of selected diagnostic cases handled by New Zealand's diagnostic laboratories. These cases do not necessarily reflect the national disease profile but they do represent diseases of interest to the livestock industries or of significance to wildlife or companion animals.

count of the gastrointestinal tract showed 40,000 *Ostertagia* spp and 38,000 *Trichostrongylus axei*, mostly immatures. The intestine contained 20,000 *Cooperia* spp, mostly adults. Rapid re-infection was suggested as the cause of this outbreak as the abomasal nematodes were immature and *Cooperia* has a short prepatent period – as low as 17 days.

Pithomyces chartarum spore counts were elevated in warm areas throughout the autumn, especially parts of Taranaki and Horowhenua, resulting in cases of **sporidesmin toxicity**. Serum samples from cattle with photosensitivity had gamma-glutamyl transferase (GGT) concentrations up to 4,140 IU/l, reflecting toxic damage to bile ducts. Glutamate dehydrogenase (GDH) was often elevated as well, as a result of hepatocyte damage.

A nine-month-old Friesian heifer died suddenly in the Horowhenua region. Postmortem examination showed an intensely reddened intestine and areas of ulceration of the intestinal surface. Bovine viral diarrhoea antigen ELISA on serum was negative, but on histopathology intranuclear basophilic inclusions were visible in endothelial cells beneath the regions of ulceration, confirming a diagnosis of **adenoviral enteritis**.

A five-year-old Jersey bull in the Manawatu had a history of illthrift and wasting with constipation over several weeks. Previous blood testing and investigation had been inconclusive. A thorough rectal examination identified fat nodules, confirmed at necropsy as **fat necrosis** in the mesentery of the spiral colon. The affected fat was composed of necrotic adipose tissue interspersed with bands of fibrosis and saponification surrounded by small to moderate numbers of multinucleated macrophages, plasma cells and lymphocytes. The inflammation is secondary to the breakdown of the fat. Massive fat necrosis in cattle occurs in excessively fat animals, especially Channel Island breeds. It can be incidental, or fatal. Severe cases can cause intestinal obstruction and emaciation. The cause is not clear but suggested aetiologies include diet (eg tall fescue), production of high levels of saturated fatty acids in the rumen, anorexia in obese animals causing mobilisation of fat and intracellular lipolytic disturbances, or compromise of the blood supply of large areas of fat in obese animals.

Several of a group of ten beef cattle, brought on to an Otago farm a year before, died over a few months after a short period of severe diarrhoea and weight loss. Blood samples from two affected cows and their calves (which were also in poor condition) were all positive for BVD virus antigen, confirming **mucosal disease**.

These animals also had very low blood selenium levels so selenium deficiency may have contributed to their poor condition.

The cause of six dairy cows on a Southland farm aborting over a short period was presumed to be **listerial abortion**. Although no history was given they were probably being fed baylage or silage as a heavy pure growth of *Listeria ivanovii* was isolated from the stomach contents of an aborted calf submitted to the laboratory.

Tissues from a purebred Simmental calf from the Gisborne area were sent for histological examination. The renal cortex had reduced numbers of glomeruli and large amounts of interstitial fibrosis. The glomeruli were small and the tubules small and irregular. There were frequent necrotic tubules. Scattered tubules contained casts with a striated appearance consistent with urate topchi. In the medulla there was extensive fibrosis, small irregular shaped tubules and large topchi. There were also large amounts of birefringent crystalline material, both associated with the topchi and on their own, consistent with oxalate crystals. The brain had mild spongiosis of the deep layers of the cortical grey matter consistent with a renal encephalopathy. This spectacular **renal dysplasia** in a purebred Simmental, and a history of others affected, suggests an inherited disorder.

Sheep

Prolific acorn crops in the autumn led to a number of cases of **acorn toxicity** in both sheep and cattle. On a Hawke's Bay farm, sheep were dying a week after grazing an area littered with acorns. Serum samples from live animals revealed azotaemia. In dead animals, typical postmortem findings included dehydration and swollen kidneys. On histology there was severe renal nephrosis with coagulative necrosis of tubule epithelium and sloughing of necrotic debris into the tubule lumen with capsular oedema. Gallotannins in the acorns are believed to be the toxic principle. Their first effect is superficial enteric damage, then microcirculation necrosis leading to leakage of fluid from blood vessels. Eventual renal tubule necrosis leads to renal failure and backup of glomerular filtrate into the perirenal tissue.

Many cases of **salmonellosis** were diagnosed throughout the Rangitikei, Wairarapa, Wanganui and Hawke's Bay through late autumn and winter. Typical histories included diarrhoea, anorexia, depression and death. Postmortem findings included intestinal congestion, watery mucoid intestinal content and widespread haemorrhages. *Salmonella* Hindmarsh was the most frequent isolate from intestinal content.

Twelve lambs died within 24 hours of grazing a newly sown paddock of heavily fertilised ryegrass in the Rangitikei district. Abdominal fluid from an autolysed carcass tested positive for nitrate, confirming **nitrate toxicity** as the cause of death. Nitrate concentrations of samples of the pasture were 5.25% dry matter (concentrations of < 1% are considered safe to feed).

Throughout May, cases of **leptospirosis** were diagnosed from the Wairarapa and Hawke's Bay regions. Typically three to four hoggets

died over a two- to three-day period. At necropsy, haematuria and jaundice of the carcass was often noted. Histologically a typical case had periacinar necrosis of hepatocytes most likely caused by hypoxia. In renal tubules there were degenerate and lysed erythrocytes sometimes associated with tubule epithelial cell sloughing. In one case two of four sick lambs sampled had *Leptospira Pomona* MAT titres of >1:1,600, confirming recent exposure.

Tutu and acorn poisoning were recorded as causing deaths in groups of hoggets grazing on two Otago farms in early winter at a time when green feed was in short supply.

On an Otago sheep farm, 1,400 ewe hoggets were shorn and four days later were drenched and given clostridial vaccine. Three days after this they were shower dipped. Ten days post dipping they were vaccinated with separate vaccines against *Toxoplasma* and *Campylobacter* abortion strains (intramuscularly and subcutaneously, respectively) by two separate workers on opposite sides of the neck. Four days later the farmer noticed about 20 hoggets off-colour, some with neck swellings. By next day many more hoggets were affected and a veterinarian was called. **Abscessation after vaccination** was diagnosed and 358 affected animals were treated with broad spectrum antibiotics. By the next day ten had died and more were affected. Two severely affected animals that failed to respond to treatment were killed and necropsied. In both animals there was a severe purulent cellulitis extending from the campylobacter vaccination site down to the sternum, and into the pleural cavity in one sheep. Bacterial culture of the lesions was unrewarding, probably because of antibiotic treatment. The toxoplasma vaccine site on the opposite side of the neck appeared normal. In all affected animals only the side of the neck vaccinated with the campylobacter vaccine was involved. Over the next ten days until no more new cases were seen numerous animals were treated, and pre-treatment pus samples taken from two new cases for cultures revealed heavy pure growths of a *Streptococcus* sp, which was further identified as *Streptococcus uberis* – an organism commonly isolated from mastitis in cattle and not reported as a pathogen or apparently carried by sheep. The partly used and unused vaccine containers were subjected to microbiological testing and all found to be sterile. The same vaccine had been used on many farms in the area at the same time and no adverse reactions had been reported. The affected hogget mob was later given a booster dose of the same vaccine without adverse effects. The outbreak affected 800 of the original 1,400 hoggets, with 40 deaths and 30 animals culled because they did not respond to treatment. The underlying cause of the problem, and the significance of the isolate cultured from two animals, has not been conclusively determined.

Goats

About seven abortions occurred in rising one-year-old does in the Waikato. Histology of the liver revealed the hepatocytes were

disassociated and there were occasional small foci of necrosis. Numerous eosinophilic intranuclear inclusions were seen within hepatocytes. The lung had occasional small foci of necrosis with occasional cells containing intranuclear inclusions. Acute, multifocal necrotising hepatitis and pneumonia consistent with caprine herpesvirus infection was diagnosed.

Horses

A six-month-old male miniature horse in the Wairarapa suffered from diarrhoea for one week. A blood sample revealed a neutrophilia of $9.79 \times 10^9/l$ in which many neutrophils showed toxic changes, indicating inflammation. There was a stress induced lymphopenia of $0.41 \times 10^9/l$. The biochemical results showed lipaemic serum with serum cholesterol concentrations of 6.1 mmol/l (reference range 1.5 - 2.9), serum triglyceride concentrations of 17.5 mmol/l (normal < 1.13), and serum magnesium concentrations of 0.39 mmol/l (reference range 0.59 - 1.02). The horse was suffering from the equine **hyperlipidaemic syndrome**, a metabolic condition in which there is uncontrolled lipolysis triggered by a negative energy balance. The low serum magnesium concentration is a result of decreased absorption secondary to gastrointestinal disease. The condition may eventually lead to severe organ disease or failure, and death. It is more common in miniature horses, ponies and donkeys.

Dogs

An 11-week-old puppy of unknown breed from Hawke's Bay with bloody diarrhoea, painful abdomen, temperature of 38°C and pale mucous membranes was diagnosed with **Campylobacter and coccidiosis**. Two other puppies had been sick and one had died. The puppy had had one vaccination for parvovirus. Haematology showed a profound neutropenia ($0.04 \times 10^9/l$), normal lymphocyte numbers ($1.03 \times 10^9/l$) and no anaemia. Biochemistry showed hypoalbuminaemia consistent with protein-losing enteropathy from diarrhoea. Faeces were negative for parvovirus but there was a heavy growth of *Campylobacter jejuni*. Coccidia found in moderate to large numbers were identified as *Isospora canis*, which, while usually of low pathogenicity, in large numbers may cause diarrhoea, and *I ohioensis*, which experimentally can cause diarrhoea in pre-weaned puppies.

A ten-year-old spayed Red Heeler bitch was presented to a referral veterinarian with vague signs including lethargy, after been treated homeopathically. The complete blood cell count (CBC) revealed a mild lymphocytosis. The biochemistry profile revealed a moderate azotaemia with hyperphosphataemia. There was a marked hyponatraemia, with a hyperkalaemia (resulting in a reduced Na:K ratio of 17.5), and a marked hypercalcaemia (4.96 mmol/l; reference range 2.16-2.98). The basal cortisol level was below the detectable limits of the test, which was consistent with hypoadrenocorticism (**Addison's disease**). The electrolyte imbalances appeared to resolve with replacement therapy but the hypercalcaemia was refractory. However, it was discovered that a component of the homeopathic remedy was 1,25 dihydroxy-cholecalciferol (vitamin D3),

explaining the hypercalcaemia. Variable hypercalcaemia is seen in hypoadrenocorticism but in this case was considered excessive and a primary cause was sought and found.

Other

The **chameleon** colony at Auckland Zoo has been destroyed by a systemic **fungus disease**, which in most cases began as a superficial skin infection and progressed to involve a range of internal organs, principally the liver. Fungal pseudo-hyphae were demonstrable in the skin lesions and granulomata in the liver. The last two remaining animals died recently and showed the typical hepatic granulomata, within which it was possible to demonstrate pseudo-hyphae and yeasts resembling *Candida albicans*. *Candida utilis* was cultured from one animal, *Candida catenulata* from the other. Such infections are uncommon according to zoo veterinarians from other parts of the world and it is not known what predisposing factors, if any, were responsible for the losses in this colony.

Nisha, an eight-year-old female Bengal **tiger** (*Panthera tigris*) at the Auckland Zoo, was treated for a respiratory disease in June of 2005 and made a complete clinical recovery. She re-presented in April 2006 with coughing and was anaesthetised for ultrasonic examination and specimen collection. CBC and biochemistry panel were unremarkable. She was serologically negative to FeLV and FIV. A tracheal wash and a fine needle biopsy from the liver were non-diagnostic. No abnormalities were found on ultrasound. Further blood samples collected two weeks later, after the animal's condition deteriorated, showed she had developed a non-responsive anaemia (Hb 88 g/l, down from 120 g/l; PCV 26%, down from 38%. Species-specific reference range not available). No abnormalities were found in a biochemistry panel run at this time. However, a repeat tracheal wash revealed a chronic active bronchitis, with the presence of dysplastic epithelium, which could not be explained by the inflammation, and a carcinoma was suspected. Paired latex agglutination *Toxoplasma* titres from two sets of samples were both 1:128, ruling out toxoplasmosis. No significant bacterial or mycoplasma isolates were obtained from the tracheal wash specimen. Blood tested for lead (the paint on her den was flaking and its lead content unknown) was negative. The animal was euthanased and necropsied at the zoo, and tissues submitted for histopathology. A multifocal coalescent papillary **carcinoma** was found in the parenchyma of the lung, accompanied by metastases in the anterior and posterior uveal tract of the eyes, the ovaries, the liver, the spleen, and thoracic lymph nodes. Infarcts in the heart and the cerebrum were suspected to be the result of tumour emboli.

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New Zealand Veterinary Pathology

Cattle

Seventeen of 50 six- to eight-month-old Devon calves died suddenly on a Southern Rangitikei property. They were depressed and polydipsic before death. Two weeks earlier they had grazed a paddock heavily contaminated with acorns. On postmortem the kidneys were congested and oedematous and there were petechial haemorrhages throughout the carcass. On histology there was severe subacute tubular nephrosis in the kidneys. The lesions looked to be about seven to ten days old, which fits with the history of access to acorns. The farmer had grazed the paddock for 17 years with no problems in the past. Presumably the **acorn toxicity** occurred this year because of a combination of factors such as the number and maturity of acorns ingested, and availability of feed. A similar case occurred in Marlborough, where a 14-month-old Friesian steer presented with photosensitivity, bloody diarrhoea, and a history of access to acorns. Creatinine and urea levels were both extremely high, suggesting acute renal failure. Acorn toxicity was again implicated.

In the Nelson area, 5-10% of a dairy herd exhibited photosensitisation with two abortions. Testing of four animals revealed uniformly high gamma-glutamyl transferase (GGT) and aspartate amino transferase (AST) levels, suggesting liver damage. The herd had been fed the end of a silage stack, which was of poor quality and contained many black flecks of mould. The pH of the silage was found to be 7.9. In general a silage pH of greater than 5 has poor keeping qualities and fungal proliferation occurs. **Mycotoxycosis** was suspected in this case.

The winter months have brought with them the usual seasonal spate of **abortion** investigations, with *Neospora* more prevalent earlier in gestation and fungal abortions diagnosed later in gestation. In a typical fungal abortion case, a single cow from a dairy herd in the Waikato aborted. There was gross evidence of placentitis, and *Aspergillus fumigatus* was isolated from the placenta. Histology demonstrated a marked necrosuppurative placentitis with intralobular fungal hyphae. Three properties also had abortions in which the dams had high titres (greater than 1:1600) for *Leptospira interrogans* hardjo. On two properties, the cows were vaccinated against both pomona and hardjo. On all three properties, titres for pomona were less than 1:200, making an increased hardjo titre due to vaccination alone less likely.

A group of four calves in the Franklin region presented with a severe scour. **Salmonella Ruiru** was isolated. This is the second time this rare isolate has been identified in the North Island over the past year, suggesting it may be becoming more common.

Deer

Fourteen of 30 stags died suddenly on a property in the Manawatu. On postmortem of two animals, the livers were swollen with a 'nutmeg' appearance and there was evidence of gastrointestinal

haemorrhage. Histology revealed severe acute periportal degeneration of the liver. **Algal toxicity** was considered the most likely cause of the deaths.

There have been several outbreaks of **yersiniosis** in deer over the autumn and winter months. In one typical case in the Manawatu, a group of six-month-old fawns began to scour and lose condition. They responded transiently to antibiotics but then worsened. Postmortem on two animals demonstrated a watery small intestinal content. Culture of intestinal content was positive for *Yersinia pseudotuberculosis*.

Lamoids

A four-week-old alpaca in the Bay of Plenty region died after a week-long illness involving recumbency and eventually scouring. Postmortem revealed a moderate abdominal effusion with scattered fibrin strands, and moderate pulmonary oedema and congestion. Histological examination revealed a marked mycotic gastritis consistent with *Candida albicans* infection, as well as a marked suppurative interstitial pneumonia. Ulceration of C1 due to the mycotic gastritis may have resulted in embolic spread of microorganisms, precipitating the pneumonia. *Candida albicans* infection has been reported in llamas and alpacas. The precise factors contributing to *Candida* infection in this case are unknown, but may have included stress, antibiotic administration or pre-existing viral disease.

A seven-year-old male castrated llama in Northland presented with progressive weakness, and was euthanased. Necropsy showed numerous firm spherical and umbilicated masses scattered through the lungs. Histological examination revealed metastatic **carcinoma** within the lung. The origin of the carcinoma was not determined.

Horses

Oleander toxicity was considered the most likely cause of sudden death in a shire draught horse. On presentation the horse was depressed, had a heart rate of 80 with a gallop rhythm and an arrhythmia. Garden clippings, including oleander, had been put in the paddock ready for burning.

A five-month-old foal presented with tetany and was found to have hypocalcaemia and hyperphosphataemia. A presumptive diagnosis of idiopathic **hypocalcaemia** was made. This syndrome has been described previously in foals. Abnormal function of the parathyroid gland has been postulated.

A horse owner in the Waikato developed enteritis and his doctor diagnosed salmonellosis. His horses were considered a possible source of infection and three horses from the property were cultured. One animal was positive for **Salmonella Typhimurium**.

A two-year-old colt was noted by its owner to be staggery and unstable on its feet. When the veterinarian attended, the colt was down and so was euthanased. On necropsy, the large intestine appeared oedematous and contained numerous small red worms.

There was multifocal ulceration of the gut lining. Histology was consistent with larval cyathostomiasis. Identification of worms in a sample of ingesta revealed that only 12% of the worms were adult cyathostomes, with the rest larval forms. Severe larval **cyathostomiasis** is caused in young horses by the simultaneous emergence of large numbers of hypobiotic larvae, causing extensive damage to the large intestinal mucosa, resulting in diarrhoea, illthrift and hypoalbuminaemia.

A Thoroughbred mare from the Kapiti coast aborted. The tissues submitted for histological examination revealed a suppurative placentitis. Culture of the placenta yielded a moderate growth of *Streptococcus equi* subsp *zooepidemicus*, consistent with a bacterial **placentitis**.

Dogs

An 11-year-old German Shepherd presented with a three-week history of diarrhoea. On biochemistry the sodium was low and potassium high, raising the possibility of pseudo-Addison's disease caused by *Trichuris* infection. Large numbers of *Trichuris vulpis* ova were found on a faecal sample.

An adult pig dog from the Waikato died acutely. On necropsy the liver was markedly enlarged and pale. Histology revealed a severe vacuolar hepatopathy. **Phosphorus toxicity** was considered a possibility based on the histological findings. Phosphorus levels in the kidney were 1,500 mg/kg wet weight, considered consistent with ingestion of approximately ten times the toxic dose of phosphorus.

A three-month-old Labrador Retriever puppy in the Canterbury region presented with a history of ascending neurological signs developing over the previous month. At the time it was sampled, the puppy had hindlimb paresis with forelimb weakness and ataxia. *Neospora* IFAT was greater than 1:800, making clinical **neosporosis** the most likely diagnosis. The prevalence of *Neospora* seropositivity can be high in some populations of dogs (particularly in rural areas), but titres greater than 1:800 are rare in healthy animals (Barber JS, Trees AJ. Clinical aspects of 27 cases of neosporosis in dogs. Veterinary Record 139, 439-43, 1996).

Cats

A 20-week-old kitten presented with a chronic cough. Radiographs showed a caudal bronchial interstitial pulmonary pattern. Cytology on bronchoalveolar lavage fluid revealed a mixed eosinophilic and macrophage inflammation with occasional parasite ova consistent with *Capillaria aerophila*. A faecal examination for parasites also showed the animal had *Aleurostrongylus abstrusus* and there were large numbers of *Toxocara* eggs present.

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Quarterly report of investigations of suspected exotic diseases

Exotic disease investigations are managed and reported by MAF's Investigation and Diagnostic Centre (IDC) Wallaceville. The following is a summary of investigations of suspected exotic disease during the period from April to June 2006.

Exotic vesicular disease ruled out

A veterinarian reported drooling and tongue ulceration in a two-year-old steer. An AgriQuality veterinarian investigated. The animal was in good body condition and had a normal temperature. There was no lameness and no vesicles were seen on the feet or in the mouth. Seven in-contact steers examined were found to be clinically normal. Differential diagnoses included *Actinobacillus lignieresii* (woody tongue), *Actinomyces bovis* (lumpy jaw), malignant catarrhal fever (MCF) and bovine virus diarrhoea (BVD). All eight animals were negative on antigen test and antibody ELISA for BVD. Vesicular disease was ruled out on clinical and epidemiological evidence. The animal probably suffered from woody tongue, and recovered with antibiotic treatment.

Anthrax ruled out

MAF was notified of multiple deaths in beef cattle on a Hawke's Bay property. Five cows and one yearling had died over a three-week period. Four of the animals had bloody discharges and rapid carcass decomposition. An AgriQuality veterinarian investigated and collected specimens. There had been no fresh deaths; the most recent was three days before the visit. No *Bacillus anthracis* were seen on a smear of peripheral blood from the most recently dead animal. The herd was not currently vaccinated against endemic clostridial diseases and it is likely the deaths resulted from infection with either *Clostridium septicum* or *Clostridium chauvoei*.

Mortality event in calves investigated

Twelve yearling calves, in a group of 240, died over a seven-day period. Two independent histopathologists diagnosed malignant catarrhal fever (MCF) in brain samples. The clinical picture of skin lesions and panophthalmitis, hypopyon, and corneal erosions in individual animals was also consistent with MCF. An investigation was started after serology was negative for MCF and more animals became ill. Fresh tissue and blood were submitted. EDTA blood, spleen, and a lymph node gave positive MCF PCR results. MCF in cattle is normally seen sporadically and affects single animals but larger outbreaks occur occasionally. The investigation was closed after it was established that lambs, possibly producing ovine herpesvirus-2, the cause of MCF, had grazed the same areas previously.

Brucellosis excluded

An emaciated seal found at Pukerua Bay, Wellington, was euthanased by the Department of Conservation. MAF conducted a postmortem examination and screened for exotic and zoonotic diseases identified in the marine mammal surveillance strategy. Serum was negative for antibodies to *Brucella abortus*, *Leptospira* serovars Canicola, Hardjo, and Pomona, and canine distemper virus. PCR tests on tissues for avian influenza were negative. The

presumed cause of emaciation was inability to feed because of an eye abscess. At postmortem the gastrointestinal tract was empty, except for a heavy hookworm burden.

Brucellosis was ruled out in a dog with bacterial discospondylitis following serology for *Brucella abortus* and *B ovis* antibodies. The dog had been imported from Queensland.

Equine viral arteritis and equine infectious anaemia ruled out

A Palmerston North haematologist reported an inflammatory leucogram and anaemia in a 23-year-old Clydesdale gelding with ventral oedema. Blood film screening was negative for haemoparasites. Equine infectious anaemia (EIA) and equine viral arteritis (EVA) were ruled out using the agar gel immunodiffusion test and virus neutralisation tests, respectively, on acute and convalescent samples. No diagnosis was made, but the clinical signs slowly resolved and the blood parameters normalised.

A veterinary pathologist phoned the 0800 number on receipt of samples from a horse with oedema. The horse was clinically sick with weight loss, dependent oedema in all four limbs, and slightly injected mucous membranes. It had a normal temperature, normal respiratory rate and no diarrhoea. Haematology and biochemistry showed a panleukopenia and hypoalbuminaemia. A serum sample submitted to the Investigation and Diagnostic Centre (IDC), Wallaceville was negative for EIA and EVA. The horse recovered following antibiotic and anthelmintic treatment.

Equine piroplasmosis investigated

After winning one of New Zealand's most prestigious races in the Hawke's Bay, a four-year-old Thoroughbred gelding was exported to Hong Kong via Australia. On two occasions blood was collected from the animal in Hong Kong and submitted to Onderstepoort, Pretoria, South Africa, for *Babesia equi* and *Babesia caballi* tests. On both occasions the horse had a positive immunofluorescence antibody test (IFAT) for *Babesia equi*. The horse remained in quarantine awaiting results of a complement fixation test (CFT) and a culture at Onderstepoort. A further sample was sent to the Central Veterinary Laboratory, Weybridge, UK. Serum held at the IDC Wallaceville from a pre-export test was negative for *Babesia equi* and *B caballi* by competitive ELISA. The Hong Kong regulatory authority stopped replying to requests for information so the issue is assumed to have been resolved favourably.

Hendra virus ruled out

A horse undergoing pre-export testing prior to travelling to Malaysia tested positive for Hendra virus on two ELISAs. The horse

was a New Zealand bred, two-year-old Thoroughbred gelding with no clinical illness. Paired blood samples submitted to the Australian Animal Health Laboratory (AAHL) were negative on ELISA. The specificity of the New Zealand screening ELISA (92.3%) is less than that of the test in Australia (96.2%) so the New Zealand test result was considered to have been a false positive. The horse left New Zealand without further incident, destined for Malaysia.

***Mycoplasma agalactiae* ruled out**

Two sera submitted to IDC Wallaceville as part of pre-export testing of a consignment of 58 sheep were positive for *Mycoplasma agalactiae* by complement fixation testing (CFT). Test results were either on or just above the cut-off, returning values of 1:40 and 2:40. The serum originated from Primera ewes used as donors for commercial embryo transfer. Serial testing with an *M agalactiae* Bommeli ELISA gave negative results. In a published study conducted at IDC Wallaceville specificity values of 94.8% and 97.9% were determined for the CFT and ELISA, respectively. Laboratory findings indicate the complement fixation test results were false positives. No historic or clinical disease consistent with infection with *Mycoplasma agalactiae* was identified in the animals. The investigation concluded that *Mycoplasma agalactiae* was not present in the flock.

A veterinary pathologist suspected caprine mycoplasma in juvenile goats with clinical pneumonia, on the basis of lung histology. A specimen submitted to the IDC for PCR testing was positive on a generic mycoplasma test. Further testing of this PCR ruled out *Mycoplasma mycoides mycoides* Large Colony (MmmLC). An IDC incursion investigator visited the farm in March, interviewed the staff and veterinarians, necropsied four animals and collected 139 blood samples. The postmortem findings indicated the goat kids were suffering from pneumonia caused by infection with several agents: *Pasteurella* spp, *Arcanobacterium pyogenes* and *Mycoplasma ovipneumoniae* (enzootic pneumonia). The serum was tested using a *Mycoplasma capricolum* complement fixation test (Mcapr CFT), *Mycoplasma agalactiae* ELISA (Maga ELISA), and MmmLC CFT. All goats were negative on the Mcapr CFT test, one animal was positive and one animal suspicious on the Maga ELISA, and eight animals were positive on the MmmLC CFT. Seropositive results for MmmLC were not unexpected since this disease is established here, but the *Mycoplasma agalactiae* seropositive animals required further investigation as New Zealand is free of *M agalactiae*. Swabs from the ear, vagina, nose and milk were collected from *M agalactiae* seropositive animals at a second visit. Blood samples were collected from a further 182 does. The swabs were negative for *M agalactiae* on culture and PCR testing at IDC. All serum was tested by the Maga ELISA. The previously suspicious animal was negative and the positive animal was suspicious. One further animal was suspicious on the second test. The herd was negative for *Mycoplasma agalactiae* by serological testing. All animals were negative for exotic mycoplasma on culture or PCR testing.

Suspected paralysis tick investigation

A member of the public notified MAF of a dog with progressive hind

limb ataxia, proprioceptive deficits and lumbar pain. The owner was concerned because she had removed ticks from the dog, and her son had recently returned from Australia. A veterinary assessment concluded that the clinical signs were most likely due to intervertebral disc disease rather than envenomation by *Ixodes holocyclus*. The dog was euthanased because of hind limb paralysis. No ticks were available for identification. The son had returned three months before the onset of clinical signs. The time frame for onset and clinical progression was not consistent with a tick bite paralysis.

Feline spongiform encephalopathy ruled out

A veterinarian reported blindness and ataxia in a 13-year-old Siamese cat. The cat had been imported from the United Kingdom five years before. Feline spongiform encephalopathy (FSE) was excluded by histology and the Western blot prionic test. The major lesions present on histology were meningeal haemosiderosis and neuronal lipofuscinosis.

***Babesia felis* ruled out**

Babesia felis was ruled out by generic *Babesia* PCR and visual examination of blood smears taken from a cat with severe anaemia. The cat was a 20-year-old female, recently imported from Singapore.

***Brucella canis* ruled out**

A pug breeder reported reproductive problems including small litters, stillbirths, small pups, and mummified puppies. The problems occurred in bitches with good reproductive histories following mating to an imported stud dog. *Brucella canis* has a different presentation from that observed, normally causing abortion in the seventh to ninth week of pregnancy and subsequent vaginal discharge. *Brucella canis* was excluded by card agglutination test and Q fever by ELISA on serum from six of the affected bitches.

A Hamilton veterinarian reported an 11-year-old dog with a unilateral epididymal abscess consistent with infection by *Brucella canis*. The dog had undergone bilateral orchidectomy as a treatment for prostatic hypertrophy. Histology revealed extensive necrosis of the epididymis with large areas of suppurative inflammation and moderate amounts of surrounding fibrosis. No bacteria were detected in a Gram-stained section of the epididymis. *Brucella canis* was ruled out after a negative card agglutination test conducted at IDC, Wallaceville.

A veterinary pathologist reported unilateral orchitis in a 13-year-old pitbull terrier. *Brucella canis* was ruled out after a negative card agglutination test. The dog was born and bred in New Zealand and had not been used as a sire.

A Canterbury veterinarian reported bilateral orchitis and epididymal swelling consistent with *Brucella canis* in a two-year-old Huntaway dog. Canine brucellosis was ruled out following a negative card agglutination test. Histology revealed testicular atrophy associated with chronic suppurative inflammation and fibrosis. Large bacterial aggregates arranged as club colonies suggested infection with *Nocardia* or *Actinomyces* spp.

A veterinary pathologist reported unilateral orchitis in a two-year-old bull mastiff. Inflammatory cells (neutrophils) were present in a semen sample. The dog was New Zealand born and had been used for breeding. *Brucella canis* was ruled out using the card agglutination test.

Avian influenza ruled out

Two guinea fowl in a flock of 60 died. Avian influenza (AI) was excluded as the cause of death by PCR test. A presumptive diagnosis of parasitism was made by a pathologist, following a postmortem examination that revealed numerous *Capillaria* worms associated with oesophagitis and ingluvitis.

A Wellington veterinarian reported the death of two ducks from a flock of 15. One duck was necropsied at the IDC. Histology by a Massey University pathologist determined the cause of death was a fungal infection. The pathological description was multifocal mycotic necrogranulomatous parabronchopneumonia with fibrinous and granulomatous airsacculitis. No lesions suggestive of AI were identified. Tissues were PCR negative for AI and culture negative for *Salmonella* species.

MAF was notified of an unusual dead bird at an Auckland property. An AgriQuality authorised person visited the site and inspected the animal. A dead black backed gull was in an advanced state of decomposition and was not suitable for sampling. There were no further deaths reported from the property in the following week and the case was stood down as a presumptive negative for AI.

MAF was notified of sudden deaths in a variety of bird species at a winery near Richmond, Nelson. A goose and a cockatiel were submitted to the IDC Wallaceville for postmortem bacteriology and virology. There were no significant gross lesions in the cockatiel. The cause of death in the goose was apparent trauma to the neck. Tracheal swabs taken from each bird for AI surveillance, as a result of heightened awareness of this disease, were negative on virus isolation and PCR testing.

Three black swans were found dead. The birds were submitted as part of AI surveillance to IDC Wallaceville. The generic influenza PCR and specific AI H5N1 PCR were negative on a range of tissues. Virus isolation was negative for AI and paramyxovirus. *Salmonella* infection, a major cause of mortalities in wild birds, was not isolated in any tissue. At necropsy, all three birds were in poor condition but no obvious cause of death was determined.

Two hundred finches were found dead on a horticultural enterprise. Twelve birds were collected and submitted as part of AI surveillance at IDC Wallaceville. The generic influenza PCR and the specific AI H5N1 PCR were negative on a range of tissues. General culture of various tissues, including intestines, did not show aerobic growth. *Salmonella* was not isolated. Histological examination did not suggest a cause of death. Some birds had full crops, which might suggest intentional poisoning. No more dead birds were found on the following days. The cause of death was not established.

A Northland veterinarian contacted the 0800 freephone after a client reported the death of ten backyard chickens over a two-week period. A bird submitted for postmortem was emaciated, with lung congestion but no swollen comb, subcutaneous oedema or internal haemorrhage. Fresh and fixed samples were submitted to IDC Wallaceville for histopathology and viral, bacterial and mycoplasma testing. Histology revealed congested lung and liver tissues without the inflammatory changes characteristic of AI. Other tissues were normal. Bacterial culture of lung and intestine grew a heavy mixed growth that included *Vibrio parahaemolyticus*, a bacterium considered unlikely to be of significance in chickens. No *Pasteurella* or *Salmonella* species were identified and no mycoplasma was isolated. Virus isolation was negative after three passages in embryonated chicken eggs, and notifiable AI was not detected using specific PCRs for H5, H7 and H5N1. No further deaths occurred following antibiotic treatment. The cause of death was not determined although suboptimal management was considered to be a contributory factor.

A member of the public notified MAF of dead and weak ducks in an urban pond in Auckland. An AgriQuality authorised person visited the site and noted the environment and number of affected birds. No significant lesions were noted at postmortem examination of a Peking duck. The clinical signs and lack of lesions suggest botulism as the cause of death. A tracheal swab tested at the IDC Wallaceville was negative for AI on virus isolation and PCR test.

MAF was notified of multiple deaths in wild Peking ducks in a location near Ashburton. On postmortem at IDC Wallaceville lead pellets from a shotgun were recovered from the gizzard of three ducks. Tracheal swabs for generic influenza viruses were negative on two birds and suspicious on the third but AI was not confirmed in this bird by virus isolation. All three birds were negative for the specific AI H5N1 PCR, and the AI H5 and AI H7 PCR from tracheal swabs. No *Pasteurella* species were isolated. The likely cause of death was lead poisoning.

Pox virus in ducks

A wildlife expert at Massey University notified IDC after finding a poxvirus infection in a Paradise duck that had been presented with a prolific lesion on the bill and chronic weight loss. The duck was euthanased for humane reasons and necropsied. Histology of samples revealed characteristic Bollinger bodies. Poxvirus infection was confirmed by virus isolation and PCR testing. The duck had been rescued as a duckling and was noticed to have lesions about two months previously. The source of virus was probably contact with a wild mallard duck at a bird shelter. Characterisation of the poxvirus by PCR tests at IDC Wallaceville indicated the virus was not a turkeypox or a fowlpox virus. The exact strain of virus is unknown. This is the first report of poxvirus in a duck in New Zealand.

European foulbrood ruled out

An AgriQuality Apiary Officer (AAO) suspected European foulbrood. Submitted samples were negative by culture for *Melissococcus pluton* and no typical Gram-positive lanceolate cocci

were seen. PCR testing was also negative. The brood signs were probably caused by half-moon syndrome, in which the nutrition of the brood is influenced by the efficiency of the adult bees.

Small hive beetle ruled out

An AAO was sent a beetle resembling the exotic small hive beetle (*Aethina tumida*). The beetle was identified by an entomologist as *Necrophilus prolongatus* – Agyrtidae, a native carrion beetle. Larvae are normally found in dead birds and mammals. It is not a pest of significance in beehives and probably indicates that there was a dead animal nearby.

Mussel mortality investigated

A blue mussel (*Mytilus galloprovincialis*) mortality event came to the attention of Biosecurity New Zealand following a newspaper interview with a whitebaiter who had noticed a large build up of mussel shells near Timaru. Samples of surviving blue mussels were tested at IDC Wallaceville. Histology revealed deep necrosis of the connective tissue of the mantle and gut, and superficial epithelial pathology of the gastrointestinal tract. The epithelial pathology was considered the result of a natural sloughing process associated with an endemic picornavirus. *Marteilia refringens*-like cells were also identified in the digestive epithelium, although there was no obvious pathology associated. *Marteilia refringens* has never been detected in New Zealand and is an OIE listed organism. The OIE reference laboratory at La Tremblade, France, ruled out *Marteilia refringens* after PCR testing gave negative results using a generic *Marteilia* primer. Transmission electron microscopy of the necrotic lesions found no evidence for viral involvement. Adverse environmental conditions appear the most likely aetiology.

Infectious haematopoietic necrosis ruled out

A fisherman caught a trout with an abnormal looking liver. Infectious haematopoietic necrosis, an exotic fish disease, was a differential diagnosis. No virus was isolated using a range of cell lines. Histology of the liver showed normal tissue architecture and there was no indication of disease.

Exotic marron ruled out

A member of the public found a freshwater crayfish and was concerned it might be an exotic marron (*Cherax tenuimanus*). A Museum of New Zealand Te Papa Tongarewa taxonomist identified the specimen from digital photographs as the New Zealand native freshwater crayfish koura (*Paranephrops planifrons*).

Exotic marine organisms investigated

Fouling samples were collected by a MAF Quarantine Service officer from an oil rig imported from Perth, Western Australia, while the rig was undergoing clearance and re-floating at Tasman Bay, Taranaki, before being towed to the Pohukura well site. The rig had been imported via Singapore, where defouling had been carried out. Three organisms were found in the fouling samples: *Bugula neritina*, an introduced species known in New Zealand; *Sphaeroma walkeri*, a

species previously identified in hull fouling samples collected from Tauranga and not known to be established in New Zealand; and *Celleporaria aperta*, a tropical organism not known in New Zealand. These finds highlight the requirement for hull defouling to prevent introduction of exotic species. The potential for these organisms to establish in New Zealand is not known. None of the organisms is considered to pose a high risk. Findings from this investigation will be incorporated into the Biosecurity New Zealand funded 'Hull Fouling Survey' in which 10% of all ships arriving in New Zealand undergo risk factor assessment and taxonomic identification of any fouling organisms.

New barnacle species identified

The National Institute of Water and Atmospheric Research (NIWA) alerted the IDC to a new species of barnacle (*Austromegabalanus psittacus*) present in the Wellington Port. Nine specimens of *Austromegabalanus psittacus* were collected during surveillance of the port. It is possible that this species of barnacle could establish in New Zealand marine waters.

New crab species identified

NIWA scientists identified a species of crab collected from a ship's hull as *Sphaerozius nitidus* (family Eriphiidae). Four specimens were collected from an overseas vessel in Auckland as part of a Biosecurity New Zealand initiative examining hull-fouling of visiting overseas vessels. The previous port visited by the ship was Singapore, where this species is common. *Sphaerozius nitidus* is unlikely to become established in New Zealand as the species is tropical and New Zealand temperatures do not favour larval survival.

Exotic Bryozoans detected

New species of Bryozoans were identified by NIWA during active port surveillance: *Hippopodina feegeensis* (Busk, 1884), *Hippoporina hongkongensis* (Liu & Li, 1987), *Savignyella lafontii* (Audouin, 1826); *Scrupocellaria diadema* (Busk, 1852). All four species, recorded for the first time, were found alive in reproductive mode on vessels from Fiji and or Tonga. A rapid impact assessment was completed by NIWA. These species were not known invasive species or species known to have caused problems in other temperate countries. While it was possible that they could establish here it is not common for tropical species such as these to establish in temperate regions. The impact of introduced Bryozoans is normally fairly benign and limited, although one tropical species – *Biflustra grandicella* – has had negative impacts in Golden Bay. It was recommended that the vessels be cleaned and antifouled and generic biosecurity measures be reviewed to ensure the risks associated with this pathway from Fiji and Tonga are addressed.

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