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Surveillance

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Chief Editor:
Elizabeth Sommerville BVSc, PhD

Assistant Editors:
Ron Thornton BVSc, PhD, MACVSc
Roger Poland DVM, BS

Correspondence and requests to receive Surveillance should be addressed to:

Assistant Editor
Surveillance
MAF Biosecurity Authority
Ministry of Agriculture and Forestry
PO Box 2526
Wellington, New Zealand
email: polandr@maf.govt.nz

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Introduction

In 2003, the long awaited Biosecurity Strategy for New Zealand was finalised, and accepted by Government. The vision it put forward is that 'New Zealanders, our unique natural resources, our plants and animals are all kept safe and secure from damaging pests and diseases', and 57 expectations of success have been identified.

The recommendations are being implemented, and through 2004/05 we expect significant organisational re-design within the biosecurity groups of all central government agencies directly involved in biosecurity. The desire for consistency across sectors will inevitably change some of the approaches used for animal disease surveillance in New Zealand.

Notwithstanding organisational changes, the international demand for current and comprehensive animal disease status reports continues. Intensification of animal production systems continues to create new paradigms for disease expression, and new knowledge of disease pathogenesis is fueling and refining our surveillance needs.

The large outbreaks of avian influenza through many parts of the world illustrate both of these drivers for new approaches to animal disease surveillance and control. It is now generally agreed that the increasing frequency of large epidemics of avian influenza is linked to intensification and growth of poultry production. It is also now well recognised that intensive poultry production systems provide an ecosystem conducive to low pathogenic strains of H5 and H7 subtypes of the avian influenza virus mutating to highly pathogenic strains. The recognition of zoonotic avian influenza infection, and the potential for genetic re-assortment to produce new pandemic strains of the virus, add further impetus to our quest to understand better the interactions of influenza viruses and the various host species they affect.

Some immediate consequences of the recent outbreaks of avian influenza are a proposal to change the international reporting and OIE recommended control standards for avian influenza, and

increased demand for surveillance that accurately informs all parties of the avian influenza status of our poultry.

While New Zealand has so far avoided outbreaks of avian influenza, in 2003 we recognised post-weaning multisystemic wasting syndrome (PMWS) of pigs for the first time. Gaps in our understanding of the aetiology and pathogenesis of this disease continue to present significant challenges to case definition and consequently to surveillance and response options. The absence of porcine reproductive and respiratory syndrome virus in the New Zealand pig population provides a unique perspective for research studies into PMWS here.

For animal disease surveillance, it is important to have ready access to reports from a variety of sources to summarise current known disease status and to focus new investigatory and research projects. The launch in 2003 of *SciQuest*, a search engine and database of New Zealand veterinary literature, represented a significant step in simplifying access to this country's veterinary literature. With the recent addition of *Surveillance* to the *SciQuest* site, we now have most of the New Zealand veterinary literature accessible through a single portal. I encourage you to explore the information available through SciQuest, either through direct subscription (www.sciquest.org.nz) or through MAF's website address (www.maf.govt.nz/biosecurity/publications/surveillance/search.htm) whenever you need current and comprehensive knowledge of New Zealand's animal disease status.

Derek Belton
Director, Animal Biosecurity
MAF Biosecurity Authority
Email: beltond@maf.govt.nz

Reports from MAF Biosecurity Authority

International animal trade

Three sections of the Animal Biosecurity Group are involved in the international trade process: Risk Analysis, International Animal Trade, and Animal Imports and Exports.

Risk Analysis Section

The Risk Analysis team undertakes many of the risk analyses upon which scientifically robust animal and animal product import health standards are based. The group also reviews risk analyses undertaken by other sections and external consultants.

International Animal Trade Section

The International Animal Trade team develops import health standards that enable importation of animals and animal products based on safeguards developed through risk analysis. It also undertakes risk analyses in collaboration with the Risk Analysis Section.

The team is also responsible for the negotiation and development of export certification for live animals and animal germplasm. It develops standards specifying requirements that apply to certification of live animals and animal germplasm for export.

Animal Imports and Exports Section

The Animal Imports and Exports team develops standards specifying requirements for transitional (such as quarantine) and containment (such as zoo) facilities, animal products and microorganisms. It is also responsible for approving these facilities and managing supervision services for them.

The group issues permits to importers when a relevant import health standard specifies that imports have to be held in transitional and containment facilities on arrival. It is responsible for dealing with import shipments that do not comply with import health standards. The team is also available for public enquiries relating to the import of animals and animal products and the export of live animals and animal germplasm.

Imports

Issues addressed

Belovo egg powders: A risk analysis was released for public consultation in April, and the review of submissions was completed in September. The draft import health standard for egg powders from the European Union was developed and has gone out for consultation. The submissions are currently being reviewed.

Import risk analysis juvenile yellowtail kingfish (*Seriola lalandi*): A risk analysis that was written by a consultant on behalf of the proponent was subjected to MAF's processes of internal peer review and external expert review. The resulting document was released for public submissions in March, and submissions were sent to the consultant for compiling into a review of submissions. The proponent has meanwhile reconsidered the project and is currently unsure of whether to proceed.

***Babesia gibsoni* in dogs:** A risk analysis was released for public consultation in March, and the review of submissions was completed in September. The import health standard is not yet finalised but tests have been added to the live dog import standards as an emergency measure for *Babesia gibsoni* following recommendations in the risk analysis.

Honeybee hive products: Following the release for public consultation in 2002 of a risk analysis carried out under contract by an external consultant, the review of submissions was completed in June. Public consultation identified a number of significant issues that required the original document to be re-written, and this is currently underway. The commodities to be considered will no longer include used beekeeping equipment.

Honeybee genetic material: A risk analysis written under contract to MAF by an external consultant and subjected to MAF's processes of internal peer review and external expert review was released for public consultation in June 2003. The review of submissions was completed in August 2003. An import health standard was developed for Germany.

New Zealand-European Union Veterinary Agreement: The New Zealand-European Union Veterinary Agreement provides for mutual recognition of equivalence of sanitary procedures and standards covering live animals and animal products.

In 1996 Cabinet agreed that New Zealand should sign and conclude the New Zealand-European Union Agreement. However, it did not formally enter into force until 1 February 2003. The Agreement affords New Zealand significant advantages, including substantially lower compliance costs and smoother clearance of animals and

Table 1: Numbers and classes of transitional and containment facilities approved by Director, Animal Biosecurity at 31 December 2003

Class of facility	Number registered
Dog and cat facilities	4
Non-compliant dog and cat facilities	1
Transitional facilities for ornamental fish and marine invertebrates	15
Low security farm animal transitional facilities	7
Sheep and goat transitional facilities	1
Imported salmon processing premises	0
Transitional facilities for biological products	118
Transitional facilities for animal products	140
Microorganism containment facilities	70
Vertebrate laboratory animal containment facilities	23
Medium security farm animal quarantine facilities	0
Field testing of farm animals – containment facilities	1
Zoological gardens	21
Transitional and containment facilities for invertebrates	18
Transitional facilities for contagious equine metritis (CEM) testing of mares	4
Avian facilities	3

animal product imports into the European Union. The Agreement provides reciprocal benefits for European Union exports to New Zealand. The import health standards developed under the Agreement are designed to minimise certification requirements for trade in animals and animal products in either direction where there are equivalent risk mitigation steps in place.

Dogs and cats: All import health standards for dogs and their germplasm have been updated in line with the Customs Prohibition Order banning dangerous dog breeds from being imported. The restricted breeds of dogs are the American Pit Bull Terrier, Dogo Argentino, Japanese Tosa and Brazilian Fila, including cross-bred dogs of these breeds.

Zoo containment standard: The Zoological Gardens Regulations 1977 were revoked on 28 July 2003 and zoos holding new organisms are now required to meet the conditions of a new MAF Standard: Containment Facilities for Zoo Animals. This Standard applies to zoo animals that are new organisms, ie those that have not been approved for release in New Zealand (for example, lions and meerkats) but are deemed to have containment approval under the Hazardous Substances and New Organisms Act 1996. These new organisms are not eligible for release and the primary purpose of containment is to prevent their escape. They are required to be held permanently in a containment facility approved under the Biosecurity Act 1993.

Tick inspections for dogs and cats on arrival in New Zealand: All dogs and cats arriving in New Zealand are now examined for ticks before a biosecurity clearance is issued. Only dogs and cats requiring post-arrival quarantine were inspected previously, but due to several exotic tick incursions on imported dogs and cats, particularly those from Australia, additional inspections are now made at the airport before clearance is given. Animals affected are those coming from Australia, United Kingdom, Ireland, Norway, Sweden, Singapore and Hawaii.

MAF Quarantine Service inspectors will examine animals, with the help of the owner, as soon as possible after arrival at the airport. If no ticks are found and all other requirements are met the animals will be released to their owners. If ticks are found they will be removed manually and the animal directed to a quarantine facility where they will be held in isolation awaiting further treatment.

There is only one tick, *Haemaphysalis longicornis*, of economic importance to agriculture in New Zealand but there are many other ticks of significance to people and animals that could establish here. These inspections are an additional safeguard to reduce the likelihood of ticks being introduced.

General

Transitional and containment facilities: The numbers and classes of transitional and containment facilities registered at 31 December 2003 are presented in Table 1.

Inspection of facilities: MAF is the enforcement agency for the Environmental Risk Management Authority (ERMA). MAF Quarantine Service (MQS) is contracted to inspect containment and transitional facilities and its performance is audited against standards for supervision. The Import Management staff approves the facilities and has worked closely with ERMA New Zealand to approve standards for containment of animals and microorganisms and report quarterly on compliance of operators with standards and containment controls.

Table 2: Number of import permits issued by Director, Animal Biosecurity during 2003

Category	Product type	Number
Animal products	Animal feed	3
	Bee	63
	Dairy	18
	Egg	4
	Fertiliser	3
	Fibre	25
	Fish	6
	Hides/skins	13
	Meat	54
	Meat/dairy/poultry/fish	3
	Pharmaceutical	11
	Porcine	19
	Poultry	4
	Wool	5
	Total	**231**
Biologicals	Biologicals – general	549
	Biologicals – products restricted to a transitional facility	265
	Total	**814**
Embryos	Bovine	8
	Laboratory animals	2
	Ovine	1
	Total	**12**
Live animals	Birds – quarantine	3
	Cattle	6
	Lamoids	18
	Goats	1
	Deer	0
	Dogs/cats	986
	Dogs/cats – quarantine	509
	Horses	27
	Fish	12
	Insects	12
	Invertebrate (other)	4
	Laboratory animals	46
	Sheep	12
	Pigs	0
	Rabbits	5
	Zoo animals	4
	Total	**1645**
Semen	Bee	1
	Bovine	74
	Canine	12
	Caprine	1
	Ovine	12
	Porcine	5
	Total	**105**
	Total permits issued	**2807**

Permits to import: There were 2,803 permits to import issued in 2003. Following the same trend as last year this is again a slight rise in number, largely resulting from the increase in number of dogs and cats being imported. The numbers of import permits issued are shown in Table 2. (Note that permits do not reflect volume of trade).

Number of import health standards introduced: There were 71 new or amended import health standards issued in 2003.

Exports

Live animals and germplasm move under the full provisions of the Animal Products Act

From 1 March 2003, exports of live animals and germplasm moved under the full provisions of the Animal Products Act 1999. Only authorised MAF employees may issue official assurances, on the basis of eligibility documentation provided by accredited persons. AgriQuality Ltd has been approved as a recognised agency and 23 of its staff have been accredited.

Recovery of MAF costs for facilitating the export of live animals and animal germplasm

New cost regulations under the Animal Products Act 1999 commenced at the beginning of the financial year on 1 July 2003, following consultation with stakeholders. These costs are invoiced when official assurances are issued, and recover MAF's costs in facilitating export markets for live animals and germplasm.

Assistance dogs (such as guide dogs) are exempt from all charges under the Regulations.

Table 3: Volume of major animal and animal germplasm exports to world regions in 2003

	Africa	Asia	Australia	Canada	Europe except UK	Middle East	Pacific Islands	Central and Sth America	UK	US
Aviary birds	622	617	6	2,343	4,614	-	-	347	15	-
Queen bees	-	937	-	516	118	-	-	-	886	-
Bee packages (kg)	-	-	-	25,121	2,160	-	-	-	-	-
Bumble bees (number of queens)	300	-	-	-	1,500	-	-	-	-	-
Wasp larvae (kg)	1,176	-	-	-	-	-	-	-	-	-
Cattle	-	15,411	-	1,219	-	-	60	2,800	-	12
Bovine embryos	-	172	-	-	179	-	-	-	350	7
Bovine semen	80,167	48,147	159,192	369	24,850	-	300	97,296	40,036	16,416
Prawns	-	-	-	-	16,000	-	-	-	-	-
Deer	-	8	-	-	-	-	-	256	-	-
Cervine embryos	-	-	-	-	27	-	-	29	37	-
Cervine semen	-	-	-	20	-	-	-	-	-	272
Cats and dogs	14	223	2,296	45	104	4	95	5	146	172
Canine semen	-	-	30	-	-	-	-	-	-	
Emus	-	-	-	-	-	-	-	-	-	-
Turkey eggs	-	-	-	-	-	-	-	-	-	-
Ducks	-	-	-	-	-	-	-	-	-	-
Ferrets	-	40	-	-	1,469	-	-	-	-	-
Goats	-	49	-	-	-	-	6	-	-	-
Caprine embryos	-	500	-	-	-	-	-	-	-	-
Caprine semen	-	-	1,152	-	-	-	-	350	-	262
Equine semen	-	-	1,585	-	-	-	-	-	-	-
Horses	-	544	1,672	26	31	4	70	1	67	250
Lamoids	-	-	-	-	-	-	-	-	-	-
Pigs	-	-	-	-	-	-	-	-	-	-
Possums	-	14	-	-	78	40	-	-	-	-
Day-old chicks and hatching eggs	-	422,000	-	-	-	762,840	6,881,650	-	-	-
Ostrich eggs/chicks	-	876	-	-	-	-	-	-	-	-
Ostrich	-	-	-	-	-	-	-	-	-	-
Rabbits	-	14	-	-	-	-	-	-	-	-
Reptiles/amphibians	-	-	-	-	500	-	-	-	-	-
Sheep – slaughter	-	-	-	-	-	43,229	-	-	-	-
Sheep – breeding	-	1,077	-	-	-	-	15	15	-	-
Sheep embryos	-	1,500	-	-	-	-	-	195	191	-
Sheep semen	-	-	5,556	-	-	-	-	1,809	1,300	-
Wallabies	-	88	77	-	124	66	-	-	-	431
Zoo animals	-	-	24	-	-	-	8	-	-	-

Note that, unless specified, embryos and semen are included in each category total.

Table 4: Comparison of major animal and animal germplasm exports for the years 1998-2003

Species/Year	2003	2002	2001	2000	1999	1998
Bee packages (kg)	27,281	18,028	11,981	14,056	17,506	25,722
Bovine semen	466,773	634,179	451,819	155,737	378,015	294,396
Cattle	19,502	10,302	10,629	9,583	5,268	8,372
Deer	264	324	59	31	67	6
Goats	55	603	914	1,641	852	1,224
Horses	2,665	3,482	3,349	3,448	3,207	3,491
Cats and dogs (all countries including the UK)	3,104	2,876	3,858	3,721	3,022	3,428
Cats and dogs (UK only)	146	187	205	3	4	7
Day-old chicks and hatching eggs	8,066,490	9,169,335	9,287,013	9,089,970	4,818,714	3,460,171
Sheep (breeding)	1,107	1,113	1,043	508	142	6,622
Sheep (slaughter)	43,229	32,158	32,819	0	43,330	202,556

Guide for semen storage centres

The draft *Guide for approval of semen storage centres exporting ruminant semen* went out for public consultation in 2003 and has now been issued. This Guide is for use by semen storage centres that export semen and operate independently of a semen collection centre. The purpose of official sanitary control of a semen storage centre is to make sure that semen for export is stored in a manner that maintains its health status, so allowing official certification. The semen storage centre must be supervised by a MAF approved veterinarian and be registered by MAF.

Number of export certificates introduced

There were 100 export certificates determined under the Animal Products Act in 2003.

Export statistics

The major animal exports and their destinations are presented in Table 3. Table 4 compares the volumes of animal exports by species over the last five years.

Carolyn Hini
National Manager, International Animal Trade
MAF Biosecurity Authority
Email: hinic@maf.govt.nz

Border inspection

The Ministry of Agriculture and Forestry is responsible for maintaining a quarantine barrier at the ports, airports and the International Mail Centre in New Zealand. The Biosecurity Authority (Border Management Group) undertakes pathway analysis, develops policy and sets standards for the clearance of vessels, aircraft, passengers, cargo, mail and associated facilities. The delivery of this service is provided by the MAF Quarantine Service (MQS), which is part of MAF Operations. The MAF Compliance Group audits MQS to ensure the service is being delivered to specification.

Airport

Overall passenger and crew numbers increased 5% above the previous year's total to nearly 3.9 million in 2003. This was driven by an 11% increase in direct flights, which reached 23,768. New airlines and extra flights have brought about the increase. The luggage of all arriving passengers and crew is either x-rayed or fully searched at every airport. The compliance with biosecurity requirements at airports has risen: the number of passengers with undeclared risk items fell by 9% compared with 2002, while the number with declared risk items increased by 7%.

Detector dogs

The Biosecurity Detector Dog programme has its own breeding programme to ensure a supply of quality dogs. Passive dogs (beagles) are used around people and baggage at international airports and at cruise ship arrivals. There are 12 handler-passive dog teams based in Auckland, three in Wellington airport, four in Christchurch airport and one that covers Queenstown and Dunedin airports. There are five active dog teams at the International Mail Centre in Auckland.

Infringement fines

Infringement fines were introduced in mid-2001. Where passengers or crew make a false biosecurity declaration they are liable for a $200 infringement fee. Approximately 6,300 fines were issued in 2003, representing a decrease of 8% from 2002. This is probably the result of increased compliance by passengers in declaring risk goods.

International mail

Nearly 47 million mail items arrived in New Zealand, virtually all of which were x-rayed. A high proportion was also screened by detector dogs. The balance of the arriving mail was screened by other border agencies. Total mail numbers decreased by 6%, mainly because hand-written letters are being replaced by emails. Of the 88,600 mail items opened, 44,722 were found with risk goods, representing a 14% increase over 2002. The detector dogs at the mail centre found 3800 risk items.

Seaports

The number of vessels arriving direct from overseas ports totalled 3,352, with an additional 4,306 visits to further ports in New Zealand. As prevention against the introduction of disease, 1,379 vessels had their stores sealed while in New Zealand territory. Although landing passengers and crew numbers decreased by 15% from 2002 to 2003, the number of passengers and crew detected with undeclared risk items rose 110% from 171 to 359.

Containers

Approximately 500,000 sea containers landed in New Zealand during 2003, with 88,000 internally inspected and 50,000 externally inspected. Approximately 95,000 containers were decontaminated, of which 93,000 were empty containers that were automatically washed on arrival.

After undertaking a sea container survey in 2001/2002, new requirements for the clearance of sea containers came into effect in September 2003.

The main features of the new requirements are:

- certification of all containers
- biosecurity checking of all containers during or shortly after discharge by port staff
- direction of all containers to MAF-approved facilities where they are subject to checking by trained personnel (usually the employee of the receiving company)
- continued MAF inspection of high risk containers
- electronic risk profiling to identify high risk containers
- electronic detention and release of containers.

Vehicles

During 2003,190,000 used vehicles and machinery were imported, a 25% increase over the previous year. All vehicles require 100% inspection. About 55% of the total were inspected before shipment by MAF inspectors stationed at various ports around Japan, and the remainder were inspected on arrival at a New Zealand port. Approximately 39% of the imported cars required treatment to remove contaminants.

Cargo

There were 40,500 consignments of personal effects imported, of which 15,000 consignments were inspected for risk goods. There were also approximately 67,000 general cargo consignments requiring clearance, a 13% increase over 2002 figures.

Brendan McDonald
Programme Coordinator, Border Management
MAF Biosecurity Authority
Email: brendan.mcdonald@maf.govt.nz

Animal disease surveillance

The tables presented here are annual summaries for 2003 of the number of submissions, and diagnoses of specific diseases, made by MAF approved veterinary diagnostic laboratories.

Table 1 is a summary of the numbers of laboratory submissions from sick farmed animals, of cases of surveillance interest to MAF, for the major livestock and avian populations.

Table 1: Numbers of surveillance interest cases and diagnoses received from approved veterinary diagnostic laboratories during 2003

CATTLE	
Total number of sick animal submissions	**9,500**
Abortion	1,060
Fungal	66
Leptospira pomona	6
Neospora caninum	151
Pestivirus	30
Congenital defects	3
Illthrift/diarrhoea	3,536
Mycobacterium paratuberculosis	306
Pestivirus infection	84
Trace element deficiency	150
Yersinia spp	104
Infertility/abnormality of the reproductive system	141
Campylobacter fetus subsp *venerealis*	0
Infectious pustular vulvovaginitis	0
Trichomonas foetus	0
Leptospira pomona	6
Other *Leptospira* spp	11
Nervous disease	426
Listeriosis	27
Hepatic encephalopathy	20
Metabolic disease	71
Polioencephalomalacia	7
Respiratory disease	367
Sudden death	901
Clostridium spp	26
SHEEP	
Total number of sick animal submissions	**2,298**
Abortions	512
Campylobacter fetus subsp *fetus*	75
Other *Campylobacter* spp	26
Toxoplasma gondii	50
Congenital defects	0
Illthrift/diarrhoea	469
Mycobacterium paratuberculosis	46
Trace element deficiency	33
Infertility/abnormality of the reproductive system	318
Brucella ovis	169
Leptospira pomona	2
Other *Leptospira* spp	4
Nervous disease	148
Clostridium perfringens Type D	1
Listeria monocytogenes (listeriosis)	44
Polioencephalomalacia	2
Respiratory disease	49
Sudden death	526
Clostridium spp	25
FARMED DEER	
Total number of sick animal submissions	**780**
Abortions	4
Congenital defects	0
Elaphostrongylus cervi	0
Illthrift/diarrhoea	327
Mycobacterium paratuberculosis (Johne's disease)	35
Trace element deficiency	21
Yersinia spp	29
Leptospira pomona	1
Other *Leptospira* spp	2
Nervous disease	134
Malignant catarrhal fever	13
Ryegrass staggers	1
Sudden death	200
Malignant catarrhal fever	20
Yersinia spp	41
Brucella ovis	0
PIGS	
Total number of sick animal submissions	**224**
Abortions/reproductive disease	22
Illthrift/diarrhoea	49
Serpulina hyodysenteriae (swine dysentery)	1
Leptospira pomona	3
Other *Leptospira* spp	1
Nervous disease	8
Respiratory disease	23
Actinobacillus pleuropneumoniae	2
Haemophilus pleuropneumoniae	0
Sudden death	78
HORSES	
Total number of sick animal submissions	**2,324**
Abortions/infertility	187
EHV1	3
Circulatory disease	170
Illthrift/diarrhoea	278
Nervous disease	81
EHV1	0
Respiratory/lymphoreticular disease	341
EHV4	0
Streptococcus equi	1
Sudden death	28
GOATS	
Total number of sick animal submissions	**272**
Abortions	7
Listeria monocytogenes (listeriosis)	9
Toxoplasma gondii	1
Congenital disease	0
Illthrift/diarrhoea	111
Mycobacterium paratuberculosis	3
Trace element deficiency	1
Respiratory disease/arthritis	9
Caprine arthritis encephalitis	0
Mycoplasma spp	0
Nervous disease	20
Listeria monocytogenes (listeriosis)	4
Polioencephalomalacia	0
Sudden death	38
LAMOIDS	
Total number of sick animal submissions	**144**
Abortions/infertility	3
Illthrift/diarrhoea	32
Mycobacterium paratuberculosis (Johne's disease)	1
Nervous disease	14
Respiratory disease	7
Sudden death	17
Clostridium spp	0
DOGS	
Abortions/infertility	19
Chemical poisonings	122
Nervous disease	562
CATS	
Chemical poisonings	28
Nervous disease	132
AVIAN SPECIES	
Total number of submissions	**116**

Table 2 lists the number of *Salmonella* serotypes by animal species diagnosed by approved laboratories.

Table 3 summarises the number of cases, from animals two years and older, with a history of nervous disease submitted to approved laboratories in New Zealand.

Table 4 lists the laboratory diagnoses, for animals two years and older, that had a clinical history of nervous disease.

Table 5 shows the number of brains, from animals two years of age and older, that were histologically screened for a transmissible spongiform encephalopathy (TSE). No lesions typical of a TSE were found.

Table 6 presents the number of surveillance inspections performed on fish farms, and the number of laboratory tests for unwanted organisms.

Table 7 presents a cumulative record of suspected exotic disease investigations conducted during 1999-2003.

Roger Poland
Programme Coordinator, Surveillance
MAF Biosecurity Authority
Email: polandr@maf.govt.nz

Table 2: *Salmonella* serotypes isolated from animals during 2003

Serotypes	Birds*	Cats/dogs	Cattle	Goats	Horses	Pigs	Sheep
Anatum			1				
Bovismorbificans			1				
Brandenburg			31		4		81
Enteritidis			2				
Hindmarsh			2				67
Infantis	1						1
Saintpaul			2	1			
Tennessee			14	1		1	
Typhimurium	3	1	80	1	7	1	9
Untyped			4				5
Total	**4**	**1**	**137**	**3**	**11**	**2**	**163**

* Avian species not including commercial poultry

Table 3: The number of cases from animals two years and older with a history of nervous disease submitted to New Zealand laboratories during 2003

Species	Cattle	Sheep	Farmed deer	Goats	Lamoids
No. of submissions	315	72	107	4	2

Table 4: Laboratory diagnoses for animals two years of age and older that had a clinical history of nervous disease during 2003

Diagnosis	Cattle	Sheep	Goats	Deer
Bacterial infection (excluding those listed)	10	1	0	1
Brain tumour	3	0	0	2
Enterotoxaemia/focal symmetrical encephalomalacia	0	0	0	0
Hepatic encephalopathy	12	1	0	1
Listeriosis	27	36	4	2
Malignant catarrhal fever	12	0	0	13
Metabolic disease	71	8	0	3
Mineral toxicoses	3	0	0	0
Plant poisoning	2	0	0	0
Polioencephalomalacia	7	4	0	5
Low copper	1	0	0	3
Tetanus	0	0	0	0
No diagnosis made	143	18	5	76
Totals	**291**	**68**	**9**	**106**

Table 5: Number of brains from animals two years of age and older that were histologically screened for a TSE during 2003

Species	Number examined	Number sent overseas	Number positive for TSE
Cattle	2,059[1]	0	0
Sheep	3,357[2]	0	0
Goats	22[3]	0	0
Deer	1,692[4]	1	0

[1] This total includes 1,456 brains from surveillance targeted at fallen stock. It also includes 514 brains from clinically normal cattle three years and older, collected on behalf of the European Commission, which were also screened for the histopathological lesions of BSE. The Commission used these samples as negative controls in trials to validate diagnostic tests for BSE.

[2] This total includes 3,337 brains from surveillance targeted at fallen stock.

[3] This total includes 21 brains from surveillance targeted at fallen stock.

[4] This total includes 1,377 brains from surveillance targeted at fallen stock.

Table 6: Salmonid surveillance during 2003

Number of salmonid farms visited	14
Number of farms with significant mortalities	3
Number of farms on which significant infectious disease was found	0

Laboratory examinations

	No of farms	No of samples	No of positives
Viral cultures	14	1,535	0
Myxobolus cerebralis	7	420	0
Yersinia ruckeri	14	1,540	0
Renibacterium salmoninarum	8	493	0

Table 7: Cumulative list of significant[1] investigations of suspected exotic diseases, 1999-2003

Diseases investigated and confirmed as negative	1999	2000	2001	2002	2003	Total
Africanised honeybee/Cape bee (*Apis mellifera capensis*)			1		5	6
Anthrax	3	2	2	5	3	15
Aujeszky's disease			1	1	1	3
Avian influenza/Newcastle disease	4	1			3	8
Bacterial kidney disease		1				1
Bovine spongiform encephalopathy[2][3]	97	330	384	2,937	2,059	5,807
Brucella abortus		3	2	4	1	10
Brucella canis	10	1	14	11	16	52
Chronic wasting disease[2][4]	12	6	7	24	1,692	1,741
Contagious agalactia		1				1
Contagious bovine pleuropneumonia					1	1
Contagious caprine pleuropneumonia		1				1
Contagious equine metritis				1		1
Dirofilaria immitis			1		2	3
Ehrlichia canis			1	3	5	9
Enterovirus encephalomyelitis	1					1
Epizootic ulcerative syndrome (fish)					2	2
Enzootic abortion – ovine, caprine		1	1			2
Equine babesiosis/theileriosis/ehrlichiosis			3	7	16	26
Equine herpesvirus type 1 (abortion strains)					1	1
Equine infectious anaemia/Equine viral arteritis	4	1	8	14	20	47
Equine influenza	1					1
Equine morbillivirus	1	1	1			3
European foulbrood	11	1		6	7	25
Exotic theileriosis/babesiosis		1	1	2	5	9
Exotic ticks				1	2	3
Feline spongiform encephalopathy	1			1	1	3
Glanders				1		1
Haemorrhagic septicaemia					1	1
Hydatids				1	1	2
Infectious bursal disease					1	1
Infectious pancreatic necrosis					1	1
Lumpy skin disease			1			1
Maedi-visna	2	1				3
Myxomatosis	1					1
Pacheco's disease					1	1
Peste des petits ruminants					1	1
Porcine reproductive and respiratory syndrome	2	1			1	4
Rabies		1	1		2	4
Rinderpest		1	3			4
Exotic salmonellosis			1		1	2
Scrapie[2][5]	19	26	1,067	636	3,379	5,127
Small hive beetle					4	4
Tracheal mite of bees (*Acarapis woodi*)		2	2	4	6	14
Transmissible gastroenteritis					1	1
Tropilaelaps clareae		2	2	4	6	14
Varroa destructor (South Island)				4	10	14
Viral vesicular disease	5	5	27	10	6	53
Total	**174**	**390**	**1,531**	**3,677**	**7,264**	**13,036**
Diseases investigated and confirmed as positive	**1999**	**2000**	**2001**	**2002**	**2003**	**Total**
Brucella suis[6]				1		1
Dirofilaria immitis[7]					1	1
Mycoplasma mycoides mycoides (Large Colony)[8]			1			1
Post-weaning multisystemic wasting syndrome[9]					1	1
Psittacine poxvirus[10]				1		1
Spirometra sp Cestode[11]					1	1
Exotic ticks[12]	1	3	2	4	7	17
Varroa destructor[13]		1				1
Total	**1**	**4**	**3**	**6**	**10**	**24**

(1) This table lists 'significant' investigations, ie those that have resulted in exclusion of either an OIE notifiable disease at least once, or other diseases more than once, in the five-year span. It is not intended to be a complete record of all exotic disease investigations, which is published each quarter in *Surveillance* in the section entitled 'Quarterly report of investigations of suspected exotic disease'. Some investigations in this table, by using specific laboratory methods, were able to exclude multiple diseases, and these are recorded against each disease excluded.

(2) These figures contain, in addition to the suspect cases reported by practitioners, cases captured by New Zealand's enhanced surveillance programme for the TSEs.

(3) BSE annual totals include the following:
2000: Includes 20 cattle brains from clinically normal cattle four years and older collected on behalf of the European Commission that were also screened for histopathological lesions of BSE. The Commission used these samples as negative controls in trials to validate diagnostic tests for BSE.
2003: Includes 1,456 brains from surveillance targeted at fallen stock. It also includes 514 brains from clinically normal cattle three years and older, collected on behalf of the European Commission, which were also screened for the histopathological lesions of BSE. The Commission used these samples as negative controls in trials to validate diagnostic tests for BSE.

(4) CWD annual totals include the following:
2003: Includes 1,377 brains from surveillance targeted at fallen stock.

(5) Scrapie annual totals include the following:
2001: Includes 1,024 brains from clinically normal sheep three years and older collected on behalf of the European Commission, that were also screened for histopathological lesions of scrapie. The Commission used these samples as negative controls in trials to validate diagnostic tests for scrapie.
2002: Includes 60 brains from clinically normal sheep three years and older, collected on behalf of the European Commission, which were also screened for the histopathological lesions of scrapie. The Commission used these samples as negative controls in trials to validate diagnostic tests for scrapie.
2003: Includes 3,358 brains from surveillance targeted at fallen stock.

(6) See Bramley D et al, *New Zealand Public Health Report* 9(2),1-3, 2002, for a report into the diagnosis of *Brucella suis* in a human. Reports on the animal health investigations following this finding are available from MAF. No infected pigs were found during serological surveillance and the source of infection for the human case remains unknown.

(7) See Stone M, *Surveillance* 30(4), 24-7, 2003, for a summary of measures taken in response to a dog imported from Australia testing positive to canine heartworm.

(8) See Jackson R, King C, *Surveillance* 29(3), 8-12, 2002, for a report of the circumstances surrounding the finding of MmmLC in goats and cattle in New Zealand.

(9) See Rawdon T et al, *Surveillance* 31(1),11-5, 2004, for a report on the diagnosis of post-weaning multisystemic wasting syndrome (PMWS) in New Zealand.

(10) See King C et al, *Surveillance* 30(3),11-3, 2003, for a report on the investigation of an outbreak of disease caused by psittacine poxvirus in rosellas in New Zealand.

(11) See Stone M, *Surveillance* 31(1), 25-7, 2004, for a summary report of the finding of a *Spirometra* sp cestode in a feral cat by a Massey University parasitologist.

(12) See Heath ACG, *Surveillance* 28(4), 13-5, 2001, for a full review of exotic tick interceptions between 1980 and 2000. Exotic tick interceptions in 2001, 2002 and 2003 are recorded in the 'Quarterly report of investigations of suspected exotic disease' of the *Surveillance* issue for the relevant period.

(13) See Benard H et al, *Surveillance* 28(3), 3-5, 2001, for a report of the incursion response to *Varroa destructor.*

Apicultural exotic disease surveillance

The report summarising the apicultural exotic disease surveillance activities for the year from1 August 2003 to 31 July 2004 will appear in the next issue of *Surveillance.*

Echinococcosis-hydatidosis eradication scheme

Please refer to the article 'New Zealand declares "provisional freedom" from hydatids', by Howard Pharo, National Manager Risk Analysis, MAF Biosecurity Authority, in the September 2002 issue of *Surveillance,* pages 3-7.

Although hydatids is no longer found in New Zealand, vigilance is maintained at meat inspection for its presence. Nine suspicious lesions (five ovine, two cervine, two bovine) were submitted for pathological examination in 2003. None was found to be echinococcosis.

Roger Poland
Programme Coordinator, Surveillance
MAF Biosecurity Authority
Email: polandr@maf.govt.nz

Varroa Management Programme

The varroa mite (*Varroa destructor*, formerly known as *V jacobsoni*) is an external parasitic mite of the honeybee. Varroa mites originate from Asia, where they were originally parasites of the *Apis cerana* (Asian hive bee). Varroa and *A cerana* appear to have evolved a stable host-parasite relationship in which mites infest most colonies, but rarely cause colony mortality.

During last century, *Apis mellifera* (European honeybee) was introduced to Asia and encountered varroa for the first time. By 1963, varroa had jumped species and could be found parasitising *A mellifera* in Japan, Vietnam, the Philippines and Russia. *Apis mellifera* has no defence mechanisms against varroa, and infested colonies invariably die unless treated to control varroa numbers. Since the 1960s, varroa has become widely distributed through Asia, Europe, the Americas and Africa, largely as a result of the international trade in bees.

Varroa was first detected in New Zealand on 11 April 2000. Following an extensive delimiting survey (see *Surveillance* 29(2), 2002), it was concluded that an eradication attempt was unlikely to succeed, and the Ministry of Agriculture and Forestry began a three-phase management programme.

Phase I

Phase I involved government funded treatment of all known infested apiaries. Between July and October 2000, 11,555 hives in 735 apiaries in the upper North Island were treated.

Phase II

Phase II was developed with extensive industry consultation, and began in November 2000. (The operational plan can be viewed at www.maf.govt.nz/varroa) The objectives of Phase II are:

- to ensure the South Island remains free of varroa for as long as practicable; and
- to mitigate the impacts of varroa in infested areas.

Phase II was originally scheduled to end in November 2002, but was continued until the end of June 2003, at which point more than $8 million had been expended. Key activities of Phase II included movement controls, surveillance, treatment research, education and compensation. These activities were reviewed in *Surveillance* 30(2), 2003.

Phase III

MAF called together a Varroa Planning Group (VPG), made up of representatives from a range of agricultural and horticultural sector groups and local government. The VPG has been supported by administrative and analytical resources from MAF.

In December 2002, the VPG released a discussion document proposing a National Pest Management Strategy (NPMS) under the

Biosecurity Act 1993 with the proposed objective of maintaining South Island freedom from varroa. The principal measure to achieve this objective is the imposition of movement controls on risk materials, and high-level surveillance that would rapidly detect a varroa incursion. Responding to such an incursion would not be part of the strategy, but the VPG anticipated signing a Memorandum of Understanding with the Crown on the appropriate response to an incursion. It was proposed that the strategy be funded by beneficiaries, in the form of contributions from South Island regional councils/unitary authorities and South Island beekeepers.

A series of 18 consultation meetings on this proposal was held in March 2003 and received strong support from stakeholders. A formal National Pest Management Strategy was therefore prepared and submitted to the Minister of Agriculture in early November 2003. Following analysis by MAF to confirm that the proposal met the relevant requirements of the Biosecurity Act, the proposal was publicly notified in December 2003 with submissions closing on 31 January 2004.

The NPMS proposal attracted 55 submissions, primarily from within the beekeeping industry. Analysis of the submissions identified that a significant body of people who would be affected by the implementation of the proposed strategy were opposed to significant elements. They were mainly opposed on technical grounds, such as the feasibility of eradication. Other submitters considered the NPMS an essential means of keeping the South Island free of varroa. Because of the diversity of opinion, on 19 April 2004 the Minister announced a Board of Inquiry to inquire into and report on the varroa NPMS proposal, under Section 63 of the Biosecurity Act.

The three-person Board must have regard to all 55 submissions, all relevant provisions of the Act, and any other matters it thinks fit. The board will hold public hearings in Wellington and three South Island locations over late May and early June 2004. Those who made submissions on the proposal have been invited to speak and call evidence. The Board has the right to limit the number of people who may speak if it considers that it is likely to result in excessive repetition.Members of the public may attend the hearings as observers.

The board is required to prepare a written report, including recommendations to the Minister, on the proposal and matters raised by the inquiry. The inquiry will be completed upon the delivery of the Board's report to the Minister, which is expected by 30 July 2004. MAF will then review the report and provide its own report before the Minister takes the final decision as to whether the strategy should proceed. If the Minister decides the strategy should proceed, it is anticipated that it will be implemented by the end of 2004.

Interim varroa control measures

MAF is maintaining existing movement control measures until the board of inquiry process is complete. These include a ban on the movement of beehives from the North Island to the South Island, and permit conditions intended to mitigate risks when moving a range of bee products and beekeeping equipment.

Varroa surveillance is being undertaken during April and May 2004 in high-risk areas of the South Island. These include ports, airports, major population centres and points receiving bee products shipped from the North Island. Surveillance will not be carried out in low-risk areas of the South Island because of budgetary constraints. It is envisaged that more extensive surveillance will be undertaken if and when the proposed NPMS for varroa is implemented.

Spread of varroa in North Island

Varroa spread widely throughout the upper North Island in 2000-2001. A movement control line from Taranaki to East Cape slowed spread into the lower North Island until mid-2003. Surveillance at that time confirmed significant spread into Gisborne, Taranaki, Wanganui, Manawatu, Horowhenua and Wellington. This appeared to be largely through natural spread to hives immediately south of the movement control line and then dissemination by commercial beekeepers throughout their businesses by normal beekeeping management practices. In September 2003, the Taranaki-East Cape movement control line was removed and replaced with a line around Hawke's Bay and the Wairarapa. Some degree of spread into those areas is expected, and it is likely that all North Island movement controls will be removed before the end of 2004.

Paul Bolger
National Advisor, New Organisms
MAF Biosecurity Authority
Email: bolgerp@maf.govt.nz

National Centre for Disease Investigation

Survey/project reports

Arbovirus surveillance

Surveillance for arboviruses has been undertaken since 1990 and uses sentinel cattle herds at sites most likely to allow *Culicoides* survival should the midges arrive in this country. During the 2003 arbovirus vector season serum samples from 17 sentinel cattle herds were tested for antibody to Akabane disease, bluetongue, epizootic haemorrhagic diseases and Palyam group viruses. All were negative in all tests.

Typing ruminant herpesvirus isolates

Over the year five recent bovine herpesvirus type 1 (BHV-1) virus isolates were typed using restriction endonuclease analysis. All viruses showed a typical BHV 1.2b pattern.

Genotyping pestivirus isolates

Recent pestivirus isolates are being genotyped. Ten isolates of bovine virus diarrhoea (BVD) virus from 2003 were sequenced and all were found to be type 1 virus. No BVD type 2 viruses were detected.

Detection of *Pasteurella multocida* from abattoir pigs

This project was extended to test the isolates for the presence of the tox-A gene. This gene is responsible for production of the toxin that causes progressive atrophic rhinitis. A total of 53 isolates were tested in a PCR for tox-A gene but all were negative.

Survey of feral pigeons for selected avian viruses

Pigeons have been identified as a possible risk factor for the spread of serious avian viral diseases. Feral pigeons from different areas of New Zealand were sampled and tested for the presence of a number of avian viral diseases. Serological tests for avian influenza (569 birds) and Newcastle disease (552 birds) were all negative indicating no exposure to these viruses. A total of 90 of 468 (or 19.2%) birds did have antibodies against avian adenoviruses. It is planned to test the birds for pigeon herpesvirus antibodies. Detailed results will be presented in the December issue of *Surveillance*.

Development of PCR tests for avian poxviruses

Two PCR tests were developed using avian poxviruses from the NCDI reference collection. One PCR amplified the 4b-core gene of fowlpox virus and was able to detect all poxvirus isolates from domestic poultry and wild birds. Sequencing showed >95% homology between the wild bird poxviruses tested but only a 70-77% homology with fowl and turkey poxviruses.

The second PCR detected only the poxviruses from wild birds but not fowl or turkey poxviruses. Poxviruses from canary, hedge sparrow, godwit and robin were found to be closely related.

Lymphoblastoid lymphomas of thymic origin in salmon

A study on the cause of these tumours in sockeye salmon is in progress. A retroviral aetiology is suspected and attempts are being made to culture the virus using lymphocyte cells, visualise it using electron microscopy and transmit it by inoculating healthy sockeye salmon.

Diseases and microorganisms identified for the first time

Post-weaning multisystemic wasting syndrome

Post-weaning multisystemic wasting syndrome (PMWS) was diagnosed for the first time in September 2003. The diagnosis was based on clinical symptoms, gross lesions, histopathology and positive immunohistochemistry for porcine circovirus type 2. By April 2004, 23 piggeries had been confirmed as infected, or suspected of being infected, with PMWS. Most cases are in the Waikato region of the North Island.

White spot virus in prawns

White spot prawn virus, which is exotic, was detected in frozen prawns imported from Thailand. The diagnosis was based on the typical gross lesions and a positive result in a PCR test.

Psittacine poxvirus

Psittacine poxvirus was identified in captive rosellas with lesions around the beak, eyelids, mouth and oesophagus. Typical poxvirus histopathology was seen including numerous Bollinger bodies. PCR testing on wax blocks of affected tissues (the only available samples) confirmed the presence of an avian poxvirus with a high sequence homology with other wild bird poxviruses. A second PCR targeting a different region of the core 4b gene showed a lower sequence homology (<80%) with other wild bird poxviruses, confirming this virus was a separate species.

Staff publications in scientific and technical journals

Berthe FCJ, **Hine PM.** *Bonamia exitiosa* Hine et al., 2001 is proposed instead of *B. exitiosus* as the valid name of *Bonamia* sp. infecting flat oysters *Ostrea chilensis* in New Zealand. Diseases of Aquatic Organisms 57, 181, 2003.

Cochennec-Laureau N, Reece KS, Berthe FCJ, **Hine PM.** *Mikrocytos roughleyi*/ taxonomic affiliation leads to the genus *Bonamia* (Haplosporidia). Diseases of Aquatic Organisms 54, 209-17, 2003.

Diggles BK, Cochennec-Laureau N, **Hine PM.** Comparison of diagnostic techniques for *Bonamia exitiosus* from flat oysters *Ostrea chilensis* in New Zealand. Aquaculture 220, 145-56, 2003.

Duignan P, **Horner G, O'Keefe J.** Infectious and emerging diseases of bats, and health status of bats in New Zealand. Surveillance 30(1), 15-8, 2003.

Horner G, Jamaludin R. Experimental infection of calves with *Mycoplasma mycoides* subspecies *mycoides* Large Colony. Surveillance 30(1), 6-8, 2003.

King C, Stone M, Wang J. An outbreak of disease caused by a psittacinepoxvirus in rosellas. Surveillance 30(3), 11-3, 2003.

Loth L. Pachecos disease ruled out in a Goffin cockatoo. Surveillance 30(3), 13-4, 2003.

Mackereth G. Reaffirming New Zealand's freedom from bovine brucellosis. Surveillance 30(3), 3-6, 2003.

Stone M, Mackereth G. Suspected human dirofilariasis (*Dirofilaria immitis*) ruled out. Surveillance 30(3), 14-7, 2003.

Taylor N, McLeod A, Thuy N, **Stone M,** Binh V, Lan L, Dung D, Barwinek F. Examining the options for a livestock disease-free zone in the Red River Delta of Vietnam. Strengthening Veterinary Services in Vietnam ALA/96/20. November 2003.

Tham K-M, Hansen M. Detection of porcine circovirus types 1 and 2 in abattoir-slaughtered pigs in New Zealand. Surveillance 30(1), 3-5, 2003.

Thornton R, **Stanislawek W.** Pacheco's disease ruled out in at-risk smuggled parrots. Surveillance 30(3), 10-2, 2003.

International conferences and training courses attended

Davies H. London Business School Senior Executive Programme, England, October 2003.

Horner G. Visit to the World Reference Laboratory for FMD, Pirbright, England, August 2003.

Horner G. Attended 6th International Congress of Veterinary Virology, St Malo, France, August 2003.

Kittelberger R. Attended Bio-Rad TSE ELISA training and a LIMS meeting at the Australian AHL, Geelong, November 2003.

Kittelberger R. Attended Bio-Rad 3rd International TSE Conference, Paris, and visited Bio-Rad Laboratories, Marnes-la-Coquette, France, December 2003.

Loth L. Attended Australian College of Veterinary Scientists conference, Surfers Paradise, Australia, July 2003.

Mackereth G, Bingham P. Attended 10th International Society of Veterinary Epidemiology and Economics (ISVEE) conference, Vina Del Mar, Chile, November 2003.

Mackereth G. Attended post-ISVEE course on advanced surveillance techniques.

O'Keefe J. Management Development Programme, Mt Eliza, Victoria. March to May, 2003

O'Keefe J. Making Critical Financial Decisions, University of Queensland, December 2003.

Stone M. Trainer at a course titled 'Risk analysis applied to disease free zones' for Vietnamese veterinarians, Strengthening Veterinary Services in Vietnam project, Hanoi, 2003.

Gary Horner

Team Leader, Microbiology

National Centre for Disease Investigation

MAF Operations

Email: hornerg@maf.govt.nz

Animal welfare

The purpose of the Biosecurity Authority Animal Welfare Group is, generally, to contribute to the achievement of the MAF animal welfare mission, which is:

- to support society's expectations for the welfare and humane treatment of animals.
- to support the development of animal welfare standards, within New Zealand agriculture, which will contribute to market success and optimum product positioning for New Zealand animal products and animals.

The group also has a specific role to ensure effective discharge of statutory responsibilities under the Animal Welfare Act 1999, and to provide secretariat support to two independent ministerial advisory committees: the National Animal Welfare Advisory Committee (NAWAC) and the National Animal Ethics Advisory Committee (NAEAC). It operates in accordance with an animal welfare philosophy regarding the use of animals in agriculture, science and recreation and for other purposes.

The group is committed to communicating and consulting with all stakeholders and to consolidating and further developing both domestic and international networks. It draws on the support of other MAF groups, such as Legal Services, Policy, Communications, Agricultural Compounds and Veterinary Medicines and the Special Investigation Group (SPIG).

Codes of welfare

The Animal Welfare Amendment Act 2002, passed in December 2002, extended the life of the six deemed codes of welfare until 31 December 2004 to allow enough time for replacement codes of welfare to be issued. The broiler chickens (fully housed) and the rodeo codes were issued by the Minister of Agriculture in 2003, and the pig and layer hen codes have been recommended by NAWAC to the Minister. NAWAC is intending to recommend the zoo and circus codes by the middle of 2004 and is also working on the commercial slaughter code and a code for painful procedures. It expects to consider draft codes for deer and cats during 2004.

The Animal Welfare Group. Standing: David Bayvel, Margaret Handscomb, Linda Carsons, Wayne Ricketts. Seated: Pam Edwards and Joanna Tuckwell

Another purpose of the Act was to extend by three years the time in which NAWAC can issue guidelines on the use of spring jaw traps. This time extension will enable a comprehensive framework for trapping, generally, to be implemented. In the meantime, local government bylaws governing the use of these traps will remain in place.

Codes of ethical conduct and independent reviews

The Animal Welfare Act 1999 requires an organisation with an approved code of ethical conduct to undergo periodic reviews of compliance of the code holder and its animal ethics committee(s) with the Act, any relevant regulations and its code of ethical conduct. In 2003, 11 reviews were carried out because the code of ethical conduct was about to expire and the code holder wished to apply for a new code. A further two reviews were carried out to meet the requirement that new code holders must undergo a review within two years of their code being approved. The reviews were conducted by four from a pool of eight accredited reviewers.

Ten reviewed organisations also had a new code of ethical conduct considered by NAEAC and approved by the Director-General prior to the legal deadline of 31 December 2003. All codes were approved for the maximum period of five years.

National Animal Ethics Advisory Committee

In addition to the reviews relating to codes of ethical conduct described above, NAEAC hosted several workshops for animal ethics committee (AEC) members, and began planning a national workshop for 2005. NAEAC also instituted a national annual awards programme, recognising individuals or institutions who have made a major contribution to the practice of humane animal-based science and the implementation of the 'Three Rs' (reduction, refinement and replacement of the use of live animals in science). The inaugural award was presented at the 2003 ANZCCART conference to Associate Professor Alex Davies from Massey University for his work on computer modelling techniques. During the year NAEAC continued to develop its relationship with relevant organisations, including the Bioethics Council; finalised several policy statements; and considered a range of other issues, including definitional and policy questions under the Animal Welfare Act.

National Animal Welfare Advisory Committee

NAWAC's principal activities in 2003 involved the development of replacement codes of welfare for the six codes deemed by the Animal Welfare Act 1999 to be codes of welfare. These relate to pigs, layer hens, broiler chickens, circus animals, zoo animals and animals used in rodeo events. In addition, NAWAC considered or provided advice on deer velveting, dubbing of poultry, electronic dog collars, religious slaughter, export of live animals for slaughter, vertebrate pest control, export of wallabies and the induction of birth in dairy cattle.

OIE Animal Welfare Working Group
Standing: Professor Tore Hastein, Dr David Wilson, Dr W Masiga, Dr D Wilkins, Dr Abdul Rahman.
Seated: Professor David Fraser, Dr David Bayvel, Dr A Gavinelli, Dr Alex Thiermann

Publications

The following publications were issued during 2003:

- NAWAC Annual Report
- NAWAC News
- NAEAC Annual Report
- NAEAC News
- Pocket Guide for Truck Drivers *Welfare of sheep, goats & cattle transported by truck within New Zealand*

Conferences

Animal Welfare Group staff members attended and presented papers at the following conferences:

- RSPCA Australia Aquaculture Conference, Canberra
- ANZCCART Annual Conference, Christchurch
- Australian Veterinary Association Annual Conference, Cairns, Australia
- Bioethics Conference, Dunedin
- New Zealand Veterinary Association Conference, Wellington
- Australian College of Veterinary Scientists, Science Week, Gold Coast, Australia

International activities

The Animal Welfare Group represents MAF in a number of important international fora, including:

- Trans-Tasman Animal Welfare Working Group
- International Air Transport Association (IATA)
- Office International des Épizooties (OIE)
- New Zealand/Australia/USA/Canada Animal Welfare Working Group

Involvement in the OIE strategic initiative on animal welfare continued to be a particularly important activity during the year. This has involved identification of New Zealand experts to participate in four separate specialist groups to develop standards and guidelines for land and sea transportation, slaughter (including religious slaughter) and killing for disease control purposes, plus involvement in the second meeting of the Permanent OIE Working Group on Animal Welfare. This meeting reviewed the recommendations of the specialist Ad Hoc Groups and developed a work programme for 2004/05. New Zealand also played an active role in planning for the OIE Global Conference on Animal Welfare in Paris, 23 – 25 February 2004.

David Bayvel
Director Animal Welfare
MAF Biosecurity Authority
Email: bayveld@maf.govt.nz

Reports from New Zealand Food Safety Authority

National Chemical Residue Programme

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

Programme objectives

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

- assessing the effectiveness of New Zealand controls and practices that ensure the chemical residue status of slaughtered animals, and the animal products produced from them, are safe and comply with regulatory residue thresholds;
- identifying when and why industry and national controls and practices have failed to provide the required conformance and then to ensure those appropriate corrective procedures can be implemented. This is agreed international practice;
- identifying the non-complying occurrence of contaminants or presence of agricultural compounds in animal products and removal of 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 to eliminate future residue non-compliances from the identified risk source.

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

Sampling year period	
1 October 2002 – 30 September 2003	1 January 2003 – 31 December 2003
Cattle, sheep, deer, pigs, horses, goats	Broilers
Ostriches and emus	Honey
Trichinella spiralis	Farmed salmon

All chemical residue analysis performed on samples submitted under the National Chemical Residue Programme must be undertaken by NZFSA-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 and wild animals; broilers; ostriches and emus; honey; and farmed salmon.

The programme includes analysis for a wide range of contaminants and agricultural compounds.

Compound classes tested are:

- antibacterials (aminoglycosides, beta-lactams, cephalosporins, tetracyclines, sulphonamides);
- carbadox;
- anthelmintics (benzimidazoles, levamisole, macrocyclic lactones);
- restricted substances (steroids, stilbenes, resorcyclic acid lactones, nitrofurans);
- dimetridazole;
- anticoccidials (lasalocid, semduramacin, narasin, salinomycin monensin, nicarbazin, amprolium);
- synthetic pyrethroids and carbamates (cyfluthrin, cyhalothrin, cypermethrin, deltamethrin, flumethrin, permethrin, fenvalerate, propoxur, propham, primicarb, methomyl, methiocarb, chloropropham, carbofuran, carbaryl, bendiocarb);
- organochlorines (DDT and metabolites, $\alpha + \beta$ hexachlorocyclohexane [HCCH], lindane, hexachlorobenzene [HCB], dieldrin, aldrin, heptachlor, heptachlor epoxide, polychlorinated biphenyls [PCBs], oxychlordane, endosulphan sulphate);
- organophosphates (chlorfenvinphos, famphur, diazinon, fenthion, malathion, dichlorfenthion, phosmet, coumaphos, temephos, propetamphos, tetrachlorvinphos, dichlorvos, chlorpyriphos, trichlorphon);
- vertebrate poisons (1080, brodifacoum, flucoumafen).

Programme results 2003/2004

Primary product group	Total number of samples	Number of detections above the NZ threshold	Number of clear samples
Farmed mammals	37,078	7	36,750
Ostriches and emus	753	2	714
Honey	825	4	821
Farmed salmon	92	0	92
Broilers	4,144	0	4,089
Trichinella	594	0	594

The following test results were above the residue threshold.

Farmed mammals:

- two for anticoccidial compounds at just above the threshold, which is set at the practical limit of detection;
- two for antibacterial compounds in bobby calves (intercepted by veterinary inspection and did not enter the food chain);
- one of brodifacoum in a feral pig (intercepted by veterinary inspection and did not enter the food chain);
- two of βHCCH (an organochlorine) in sheep, just above the residue threshold set at the practical limit of detection.

Ostriches and emus:

- pesticides slightly above the default threshold of 0.01 mg/kg in fat (fat of ostriches and emus is a marker tissue and not consumed);

- chemical elements (mercury) in kidney tissue just above the residue threshold set at the practical limit of detection. There were no residues of mercury in muscle that was tested (kidneys do not enter the food chain).

Honey:

- Traces only of two pesticides above the default threshold set at the limit of detection.

Acknowledgement

This report was supplied with the kind permission of the Director (Animal Products), NZFSA.

Mike Clear
Programme Manager (Residues), Animal Products
New Zealand Food Safety Authority
Email: mike.clear@nzfsa.govt.nz

TSE programme

New Zealand is free from the transmissible spongiform encephalopathies (TSEs) of animals including bovine spongiform encephalopathy (BSE), scrapie of sheep and goats, and chronic wasting disease of deer (CWD). The European Commission's Geographical BSE Risk Assessment (GBR) has classified New Zealand as a Category 1 country, meaning that it is highly unlikely that New Zealand cattle are infected with the BSE agent.

A comprehensive TSE preventive and surveillance programme has been put in place. This is primarily directed at preventing the entry into New Zealand of TSE agents. There is also a programme to prevent the consumption of ruminant meat and bone meal by ruminants. A major activity is targeted surveillance of susceptible livestock (ie cattle, sheep, goats and deer). Contingency plans for dealing with any suspect cases in livestock have been developed. The programme is supported by an active communications strategy.

A multidisciplinary group, the TSE Steering Committee, oversees all activities. Members include senior technical and management personnel from the Ministry of Agriculture and Forestry (MAF), New Zealand Food Safety Authority (NZFSA), Ministry of Health and Ministry of Foreign Affairs and Trade. An independent BSE Expert Science Panel has also been actively involved in policy development.

From an operational perspective, there are six sub-programmes managed within MAF and NZFSA:

- imported foods standards,
- imported animals and imported feed controls,
- internal ruminant feed controls,
- animal disease surveillance,
- animal disease contingency planning,
- communications.

On the international scene, MAF and NZFSA also take a keen interest in the TSEs in general.

There have been ongoing reviews of all the sub-programmes, taking into account the expanding understanding of the epidemiology of the TSEs in both animals and humans, and the disease situation internationally. Significant areas of work were as follows.

Food standards

In January 2002, New Zealand introduced new import procedures to manage the risks to public health from BSE in food. The import measures protect consumers from the risk of vCJD by preventing the importation of meat products of bovine origin that potentially contain the BSE agent. Under the BSE measures, a country must be categorised according to its BSE risk status before it can export bovine meat products to New Zealand. Certification appropriate to a country's categorisation must accompany all exports to New Zealand of bovine meat products.

Categorisation of both Canada and the United States is currently being reassessed following the occurrence of BSE in those countries.

Feed controls (imports and internal)

Ruminant feed controls have been a key focus. The importation of all risk feeds and feed ingredients, especially meat and bone meal, and the feeding of ruminant protein (with the exception of dairy products) to ruminants is prohibited. Laboratory analyses that could be used to validate the effectiveness of these controls have been investigated. The testing procedure currently being used is an immunoassay screen test with follow-up microscopy and PCR. Work in this area, in collaboration with the livestock feed and cattle industries, is continuing.

Animal disease surveillance

Activities in this area fall into three areas: screening by veterinary laboratory diagnosticians of tissues from animals with behavioural signs suggestive of nervous disease, slaughterhouse surveys for abnormal brainstem prion protein, and monitoring of imported animals.

Since the beginning of 1990, MAF Biosecurity Authority has maintained a continuous TSE surveillance and monitoring programme to support international acceptance of New Zealand's TSE-free status. The programme involves the following components:

- A TSE awareness campaign amongst veterinary practitioners and farmers. In 2002 MAF increased the financial incentives offered for its TSE Surveillance Programme, and changed to a system of direct payment to farmers and veterinarians (refer to www.maf.govt.nz/biosecurity/pests-diseases/animals/tse/surveillance-incentives.htm for more information).
- All TSEs have been notifiable since 1993.

- A toll-free telephone number to report any cases of suspected exotic disease.
- National Centre for Disease Investigation support for expert investigation of suspect cases.
- A network of MAF-approved veterinary diagnostic laboratories.
- MAF's Expert Veterinary Pathologist.
- Referral of samples from TSE investigations, when necessary, to international reference laboratories.

Refer to Tables 3-5 of the Animal Disease Surveillance Report in this issue for the results of this screening programme in 2003. During 2003, 1,456 cattle (~80% fallen stock and ~20% emergency slaughter) were subject to testing for abnormal brainstem prion protein using a western immunoblot assay. In addition, 3,337 sheep, 1,377 deer and 21 goats were likewise screened. All results were negative. This work is continuing and will be adjusted to bring it into line with international standards and perceived market access needs.

Currently there are 906 imported animals under surveillance (580 sheep, 156 cattle, 114 goats and 56 deer). All are subject to annual inspection and, when presented for slaughter, brainstem testing.

Communications

Activities to inform rural communities about the TSEs, especially BSE, continued over last year. Fact sheets were distributed at the major national field day and articles were published in the rural press. Industry groups were also active, especially in the area of encouraging farmers to report suspect cases for investigation.

An important communications forum is the TSE Liaison Group meetings. Two were held during 2003; a wide range of interested parties (eg representatives of producers, processing industries, consumers and government) attended. In New Zealand, 'TSE events', especially relating to BSE, commonly lead to high profile media comment and are of considerable public interest. The Communications Group has a key coordination function at these times. The year 2003 will be remembered for a report of a possible vCJD human case in New Zealand (but subsequently ruled out), and the reported cattle cases of BSE in Canada and the USA.

International perspectives

New Zealand is an active member of OIE and is willing to assist in the simplification of the OIE Terrestrial Animal Health Code in relation to BSE and other TSEs. New Zealand is interested in ensuring that the risk-based approach set out in the Code is proportionate to the public and animal health threat associated with BSE, and that it reflects contemporary science and experience with the disease.

Terry Ryan
TSE Programme Coordinator
New Zealand Food Safety Authority
Email: terry.ryan@nzfsa.govt.nz

Bovine cysticercosis

Suspected *Cysticercus bovis* lesions are submitted to one specific animal diagnostic laboratory approved by MAF for this purpose. In 2003 there were 52 submissions. A submission consisted of one or more lesions from one or more animals from one owner from the animals slaughtered the same day. Evidence of cestode involvement was reported to varying degrees in 13 laboratory reports. Five of these reports referred to animals from one farmer whose cattle were subjected to additional meat inspection procedures and movement conditions following a cluster of cases identified on his property in 2002. All product from these cattle that has passed inspection is frozen before sale is permitted. The results of meat inspection on cattle from this property are continuously monitored.

Glen Neal
New Zealand Food Safety Authority
Email: glen.neal@nzfsa.govt.nz

Reports from National Pest Management Strategies

Bovine tuberculosis

Mycobacterium bovis, the causative agent of bovine tuberculosis, is a reportable organism under the Biosecurity (National Bovine Tuberculosis Pest Management Strategy) Order 1998.

Tuberculosis in cattle

At 30 June 2003, 275 (0.4%) cattle herds were classified as infected with tuberculosis. During the preceding 12 months, 300 herds (63.6% of infected herds) were cleared of infection and 211 (0.3%) new herds were identified as infected. The 12-month infected-herd period prevalence to 30 June 2003 was 0.82%.

During the 12 months to the end of June 2003, 5.55 million cattle (3.33 million dairy cattle and 2.22 million beef cattle) were tested with the intradermal caudal fold tuberculin test (CFT). Of these, 641 skin test-positive animals were identified and slaughtered.

An additional 9,628 cattle that were considered to be non-specific CFT test-positive animals were allowed an ancillary serial test (gamma interferon [Bovigam] test or comparative cervical test [CCT]). There were 1,131 (11.8%) reactors to the ancillary serial tests and these were slaughtered. Ancillary parallel testing (gamma interferon or modified lymphocyte transformation assays) was undertaken on 14,836 CFT-negative cattle from infected herds. There were 180 reactors to the parallel tests and these were all slaughtered.

In total, 1,952 reactor cattle (4 per 10,000 cattle tested) were slaughtered, of which 481 (24.6%) had visible lesions of tuberculosis.

A further 286 (0.012%) tuberculous cattle were detected during routine meat inspection of the 2.4 million cattle sent for slaughter during the previous 12 months.

The 12-month period prevalence of tuberculosis in cattle (481 tuberculous reactors and 286 infected cattle found during routine slaughter) for the 2002/03 season was 8.5 per 100,000 cattle (base cattle population of 9 million).

Tuberculosis in deer

At 30 June 2003, 67 (1.3%) deer herds were classified as infected with tuberculosis. During the preceding 12 months, 50 herds (50.8% of infected herds) were cleared of infection and 37 (0.7%) new herds were identified as infected. The 12-month infected-herd period prevalence to 30 June 2003 was 2.19%.

During the 12 months to the end of June 2003, 814,000 deer were tested with the mid-cervical intradermal tuberculin test (MCT). Of these, 1,064 test-positive deer were identified and slaughtered.

An additional 9,817 deer that were considered to be non-specific MCT test-positive deer were given an ancillary test with either the CCT or blood Tb (BTB) test. There were 287 (2.9%) reactors to the ancillary tests and all were slaughtered.

In total, 1,351 (0.17%) reactor deer were slaughtered, of which 129 (9.6%) had visible lesions of tuberculosis.

A further 388 (0.074%) tuberculous deer were detected during routine meat inspection of the 525,000 deer sent for slaughter during the last 12 months.

The 12-month period prevalence of tuberculosis in farmed deer (129 tuberculous reactors and 388 infected deer found during routine slaughter) for the 2002/03 season was 2.3 per 10,000 deer (base farmed deer population of 2.25 million).

Prevalence of tuberculosis

The point prevalence of infected cattle and deer herds at 30 June 2003 was 0.49% and the 12-month period prevalence for 2002/03 was 0.91%.

Tuberculosis in wildlife

Tuberculous possums and occasionally other wildlife species (pigs, deer, cats, ferrets, stoats, hedgehogs and hares) have been identified in 18 discrete areas of New Zealand in association with persistent infection in cattle and deer herds. These are known as Vector Risk Areas (VRAs). Possums (*Trichosurus vulpecula*) are considered the main wildlife vector of tuberculosis for cattle and farmed deer but in a number of VRAs ferrets (*Mustela furo*) are regarded as the primary vector.

The VRAs cover approximately 39% of New Zealand's land area. In the 2002/03 season, the VRAs contained 91% and 97%, respectively, of cattle and deer found to be tuberculous; and 89% and 96%, respectively, of infected cattle and deer herds. During 2002/03, three existing VRAs expanded. Tb was eradicated from the wild animal population in one VRA.

The balance of New Zealand is classified as Vector Free Area (VFA). The VFAs account for 61% of New Zealand's land area and in 2002/03 contained 11% and 4%, respectively, of infected cattle and deer herds.

Animal Health Board

As a result of acceptance by stakeholders and the government of its proposed National Pest Management Strategy (NPMS) for controlling bovine tuberculosis, the Animal Health Board (AHB) became the management agency for the control of bovine tuberculosis under the Biosecurity Act 1993. Implementation of AHB's NPMS began in 1996/97 with an expansion of the vector control programme as well as introduction of more stringent policies to restrict spread of infection from movement of infected cattle and deer. Expansion of the vector control programme has largely been responsible for the 73% reduction in the number of infected cattle and deer herds over the period 1996/97 to 2002/03. In 2002/03, vectors were controlled over 7.5 million ha of land.

For cattle, 2002/03 was the ninth year in succession that the number of infected herds has declined, reversing an upward trend that had persisted during the period 1980-1994. This downward trend in infected cattle herds appears to be continuing in 2003/04, albeit at a slower rate.

Similarly, the number of infected deer herds has declined since 1992/93. This downward trend appears to be continuing in 2003/04.

The AHB's new NPMS for Tb control is likely to be introduced by June 2004. The principal objective of the new NPMS is to reduce infected cattle and deer herds to a 12-month period prevalence of 0.2% by 2012/13.

Research

Research programmes have been initiated to provide a better understanding of the tuberculous wildlife problem and to develop more cost-effective means of control, including biological control of wildlife vectors.

Research has being undertaken to improve the sensitivity of the gamma interferon diagnostic test in cattle and the diagnosis of Tb in wildlife species. In addition, a major research project has found that BCG vaccine in a lipid matrix remains viable at room temperature for 30 days. A trial to evaluate the efficacy of this vaccine in a tuberculous possum population will commence in 2003/04. A Tb vaccine for possums is seen as another tool that could be used to control Tb in domestic and wild animal populations in New Zealand.

Paul Livingstone
Technical Manager
Animal Health Board
Email: livingstonep@ahb.org.nz

American foulbrood

American foulbrood, or AFB, caused by *Paenibacillus larvae*, has been regulated by an Apiaries Act since 1906. In October 1998, responsibility for AFB control passed to the National Beekeepers' Association (NBA), who developed a National Pest Management Strategy (NPMS) under the Biosecurity Act 1993. The NBA is the management agency for the strategy. The NPMS has retained many of the provisions from the previous Apiaries Act along with some new features:

- Every apiary must be registered and all hives inspected annually, and the disease status reported, by an approved beekeeper.
- To become approved, beekeepers must submit a hive and AFB management plan to the NBA and agree to sit a competency test on AFB recognition and control.
- Beekeepers must submit samples of bees and/or honey for AFB testing if so requested.
- All hives with AFB symptoms must be destroyed, although some equipment can be sterilised by heating in paraffin wax at 160^{o}C for at least 10 minutes.
- Antibiotics cannot be used to control AFB.
- The AFB Strategy is funded by an apiary levy under the Biosecurity Act 1993. All beekeepers are required to contribute through a base fee of $20 plus $8 per apiary. Beekeepers with fewer than four apiaries or fewer than 11 hives pay the base fee plus one apiary fee. Those above the threshold pay the base fee plus $8 for all apiaries registered on the date the levy is struck.

Hive inspection and audit programme to 30 June 2003

In 2002-2003, AFB was found and reported in 475 apiaries (2.3%) and 1,035 hives (0.34%) from 171 beekeepers (4.6%). The corresponding figures from the 2001-2002 year were 648 apiaries (3.2%) and 1,457 hives (0.48%) from 229 beekeepers (5.8%).

Apiary register and statistics

As at 30 June 2003, AgriQuality Ltd recorded 3,649 registered beekeepers with 20,228 apiaries and 300,729 hives, compared with 3,973 beekeepers, 20,258 apiaries and 305,152 hives in 2001-2002. The ongoing spread of the varroa bee mite in the North Island, and the decision of the National Beekeepers' Association to levy all beekeepers to pay for the AFB Pest Management Strategy, has resulted in a continuing reduction in the number of registered beekeepers. Beekeeper numbers have reduced by more than 1,400 (28%) since the arrival of the varroa mite in April 2000, although some of this reduction has occurred in parts of New Zealand where varroa is not present.

Murray Reid
National Manager Apiculture
AgriQuality New Zealand Ltd
Hamilton
Email: reidm@agriquality.com

Reports from industry surveillance and disease control programmes

Enzootic bovine leucosis eradication scheme

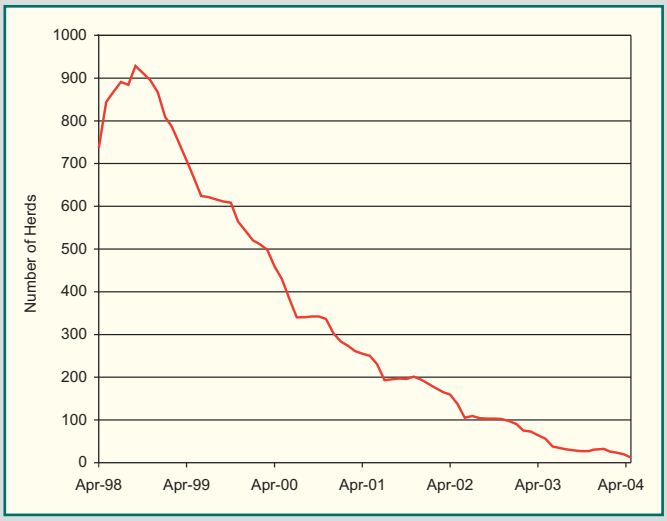
The New Zealand dairy industry enzootic bovine leucosis (EBL) eradication scheme is close to achieving dairy industry freedom. The annual incidence has been less than 0.1% since 2002 and fewer than 10 EBL-positive herds are forecasted for the end of July 2004

Official freedom from EBL for dairy herds supplying milk to manufacturers is being considered as a biosecurity programme under the World Organisation for Animal Health (OIE) guidelines.

The scheme has strong industry support. Dairy InSight funds the scheme with a product levy and it is a condition of supplying milk to dairy companies that farmers must test for and cull EBL-positive animals. All laboratory testing, scheduling and scheme administration is conducted under recognised external quality audits. Herd screening is undertaken using bulk milk and individual animal milk samples, with ancillary blood testing in positive and infected herds[1][2][3][4].

Herd status and progress toward eradication

The point prevalence of infected 'blood-positive' status herds has been reduced from a peak of 928 (6.3%) in 1998 to 21 (0.17%) in April 2004. This compares with 64 herds (0.5%) 12 months ago (see figure). The total number of dairy herds under surveillance declined from 14,673 in 1998 to 12,412 in April 2004. Efforts were focused on reducing the higher levels of EBL infection among large herds this season, with excellent progress.



Left:
Point prevalence of EBL-positive herds from April 1998 to April 2004

Herd EBL status for dairy herds (April 2004)

EBL herd status	Herd status	
	%	N
EBL-free	91.15%	11,313
Negative	8.11%	1,007
Provisionally negative	0.30%	37
Untested	0.04%	5
Suspect	0.22%	27
Blood-positive	0.17%	21
Milk test-positive	0.01%	2
Totals	**100%**	**12,412**

EBL-free herds have previously been tested for at least three years with a negative result. Negative herds have been screened at least once with negative test results using milk samples. Suspect herds contain animals that have been purchased or leased from positive or other suspect herds. Milk test-positive herds have not completed the required blood testing to confirm status. Provisionally negative herds are herds that were previously infected herds.

There was also a significant reduction in suspect herds this year from 141 in April 2003 to 27 in April 2004[5]. By April 2004, 11,313 herds (91.1%) had achieved EBL-free status (see table). With only five untested herds the scheme continues to achieve excellent surveillance of the population.

Incidence

Eleven new positive herds were identified by annual testing over the 12-month period ending 1 May 2004. The annual herd incidence was therefore less than 0.1%. Three of these were new dairy herds formed at the beginning of the season. Two previously positive herds had achieved a 'provisionally negative' status but then returned positive test results on annual screening. The remaining six herds had been screened negative in previous seasons. Annual incidence rates remain low and evidence indicates these are due to residual disease within the dairy cow population and movement of dairy animals between herds rather than the result of introductions from beef herds.

Dairy industry freedom

The EBL scheme has developed strategies for long-term surveillance once disease freedom is achieved so that continued freedom from EBL can be demonstrated. These include research to continually improve test sensitivity and specificity and improve herd-screening options.

Period incidence rates are below international requirements for disease freedom and levels of surveillance remain high. The scheme should thus be well placed to seek international recognition for EBL disease freedom for the New Zealand dairy industry.

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David Hayes

Animal Health Manager

Livestock Improvement Corporation

Private Bag 3016

Hamilton

Email: dhayes@lic.co.nz

Brucella ovis flock accreditation scheme

The *Brucella ovis* flock accreditation scheme is a voluntary scheme strongly supported by the main sheep breed societies and veterinarians. Most commercial flocks are free of *Brucella ovis* infection, but in some areas of New Zealand veterinarians are still involved in controlling and eradicating the infection.

Currently two laboratories are accredited to undertake serology: Gribbles Veterinary Pathology Serology at Palmerston North, and LabWorks Animal Health at Lincoln. A central register is not maintained because of cost.

Veterinarians who want to know more about the scheme, including the guidelines for accreditation, or obtain copies of certificates, should contact the testing laboratory or the author (address below).

Dave West

Chairman, Brucella ovis Accreditation Committee

Institute of Veterinary, Animal and Biomedical Sciences

Massey University

Private Bag 11 222

Palmerston North

Email: D.M.West@massey.ac.nz

Equine viral arteritis control scheme

Equine viral arteritis (EVA) was discovered in the New Zealand horse population in 1988. It had been accidentally introduced with the importation of Standardbreds from the USA some time previously. The equine arteritis virus is transmitted in the semen of infected 'shedder' stallions and through the respiratory discharges of recently infected horses. In September 1989, EVA was made a notifiable disease under the Animals Act and a control scheme was developed to allow shedding stallions to remain at stud while avoiding transmission of the disease to other stallions. There were 22 known shedder stallions in New Zealand at that time.

The clinical signs of infection with EVA are variable, ranging from inapparent to relatively mild, through to severe disease. The classical disease picture involves an incubation period of one to eight days, followed by fever lasting one to five days, leucopaenia, possibly upper respiratory tract inflammation and discharges, weakness, depression, anorexia, dependent oedema and abortion in the pregnant mare. The virus can cause severe respiratory disease and enteritis in young foals. On the other hand, EVA may present as transitory inappetence. Clinical signs are more severe in old, young or debilitated animals. Older horses rarely die. Abortions can occur from two months of gestation onward. There have been no clinical cases in New Zealand and the strain in this country appears to be of low pathogenicity.

With the increasing practice of shipping Standardbred semen around the country, in 1993 the EVA Control Scheme was adapted to allow shedder stallion semen to be sent to other properties as long as MAF had applied Disease Control Place Notices and inseminated mares were kept separate for 21 days from those served by non shedders. Any seronegative stallions (including teasers) standing alongside shedder stallions or on properties to which shedder semen was being transported had to be vaccinated. The live attenuated vaccine used in New Zealand requires one injection and gives good immunity.

The control scheme progressed well until early in 1997 there was believed to be only one remaining 'commercial' shedding stallion at stud in New Zealand.

During 1997/98 results of a semen export test showed there had been a breakdown in the scheme and at least one new Standardbred stallion had become a shedder, presumably through contact with an infected mare. The New Zealand Equine Health Association (NZEHA) in conjunction with MAF developed and implemented a new EVA Control Scheme. Initially stallions that had been on the same property as a shedder, or on properties to which infected semen had been transported, were tested and that was followed by testing of all Standardbred and Thoroughbred stallions as well as some of other breeds. These surveys identified six EVA shedders, of which three have since died.

At the end of the 2000/2001 breeding season it was discovered that semen had again been shipped to properties that had not been approved. Because of this non-compliance the scheme was further revised and new requirements imposed for the registration of receiving properties, including the opportunity for annual audits.

Until August 2003, owners of shedder stallions were able to test them annually to check whether they had spontaneously cleared of the infection. They could then apply to the EVA Control Scheme Coordinator for a further set of tests by an independent veterinarian to prove the change of status. The NZEHA would consider the results and recommend to the CTO of MAF that the stallion be accepted as a non-shedder and controls over his use be removed.

Because of recent information that gonadotropin-releasing hormone (GnRH) antagonist could potentially be used to mask shedding, the opportunity to prove 'self cure' was removed from the scheme. Until more is known about the use of this drug, or others that may affect tests for virus, any horse known to be an EVA shedder will continue to be considered a shedder and will have to be managed under the scheme.

The NZEHA aims to eradicate EVA from New Zealand while still allowing owners of shedders to continue the safe use of their stallions until they are no longer required. There are presently two shedder stallions remaining and the NZEHA will have to wait for them to be removed from service and ensure no further breakdowns occur.

John O'Flaherty
Technical Adviser, NZEHA
Email: oughterardfarm@xtra.co.nz

Wayne Reid
EVA Control Scheme Coordinator
Harness Racing NZ
Email: wayne@hrnz.co.nz

Infectious bursal disease eradication programme

There has been an industry funded and managed eradication programme in place since 1994. The strain of IBD virus found in New Zealand was of low virulence. In 2003, 17,912 commercial poultry were serologically tested, with none positive.

For details concerning the programme, please refer to the article 'Poultry disease surveillance in New Zealand' by Michael Brooks, Executive Director of the Poultry Industry Association of New Zealand, in the March 2003 issue of *Surveillance*, pages 13-14.

Roger Poland
Programme Coordinator, Surveillance
MAF Biosecurity Authority
Email: polandr@maf.govt.nz

Poultry health surveillance

The tables presented here give a summary of results generated during 2003 by the New Zealand poultry industry and other poultry sample testing laboratories. Table 1 summarises serological test results. Table 2 summarises *Salmonella* serotypes cultured from food sources and poultry samples.

Roger Poland
Programme Coordinator, Surveillance
MAF Biosecurity Authority
Email: polandr@maf.govt.nz

Table 2: Serotypes of *Salmonella* isolated during 2003

	Number of isolates	
Serotype	**Food sources**	**Broiler samples***
Agona		81
Anatum	16	5
Anatum 15+	1	
Brandenburg	17	
Cubana	3	
Derby	3	
Enteriditis PT9a	1	
Give 15+	36	
Havana	2	
Infantis	25	10
London	2	
London 15+	8	
Mbandaka	127	
Oranienburg	10	
Papuana	1	
Rissen	4	
Rubislaw	3	1
Senftenberg	5	2
Tennessee	19	
Typhimurium	2	2
Typhimurium PT 1	1	21
Typhimurium PT 10	1	
Typhimurium PT12a	2	4
Typhimurium PT 41		1
Typhimurium PT 101		1
Typhimurium PT 135		8
Typhimurium PT 156	4	
Typhimurium PT 160	13	
Typhimurium PT 193	1	
Westhampton	2	
Unknown serotypes	16	3
Total	**325**	**139**

* Samples include neck flap, caeca, and environmental samples

Table 1: Serological test results for 2003

Disease	Category*	Vaccination status **	Serological testing	
			No tested	No positive
Avian paramyxovirus 1	1,2,3,4		3,650	0
Egg drop syndrome '76	1,2,3,4		772	54
Infectious bursal disease[1]	1,2,3,4		17,912	0
Chicken anaemia agent	1,2,3	V	5,785	2,327
Avian encephalomyelitis	1,2,3,4	V or (V)	4,051	3,424
Infectious bronchitis	1,2,3	V or (V)	7,536	6,953
Infectious laryngotracheitis	3	(V)	148	100
Reovirus	1,2	(V)	3,620	2,019
Marek's disease	2		720	0
Adenovirus	1,2		3,520	221
Mycoplasma gallisepticum	1,2,3,4		15,269	319
Mycoplasma synoviae	1,2,3	(V)	9,460	7,323
Mycoplasma meleagridis	4		350	0
Salmonella Pullorum	1		1,470	0

* Category
1 Breeder
2 Broilers
3 Commercial layers
4 Turkey

** Vaccination status
V Most vaccinated
(V) Some vaccinated

[1] The strain of infectious bursal disease virus present in New Zealand is of low virulence and does not cause clinical disease. There has been an industry funded and managed eradication programme in place since 1994.

Quarterly review of diagnostic cases – January to March 2004

Each quarter, Surveillance publishes a review of selected diagnostic cases handled by New Zealand's veterinary diagnostic laboratories, all of which are owned by Gribbles Veterinary Pathology. These cases do not necessarily reflect the national disease profile but they do represent diseases of interest to the livestock industry or of significance to wildlife.

Cattle

A steer from the Patea/Taranaki region was serologically positive for both **bovine virus diarrhoea** (BVD) antibody and antigen indicating infection in which an immune response was just commencing and the virus was still present in the bloodstream. A four-month-old Hereford bull calf that had been losing condition for about two months showed submandibular oedema and epiphora. BVD antigen ELISA was positive and antibody ELISA negative, confirming the animal was persistently infected.

A large number of outbreaks of hepatogenous **photosensitivity** occurred in dairy cattle grazing summer turnips over the dry February in South Otago. Most cattle tested showed evidence of severe liver damage. On one farm 17 cattle were affected. In a few small outbreaks affected cattle had been grazing only pasture and grain. Most animals gradually recovered although some with severe skin damage had to be culled. A similar condition was seen in this area at the same time last year. The suggested cause is elevated concentrations of hepatotoxic glucosinolates induced in turnip crops by drought stress. Manawatu dairy cows grazing turnips previously submerged by flooding in February 2004 developed severe photosensitisation and had greatly increased glutamyl dehydrogenase (GLDH) and gamma glutamyl transferase (GGT) concentrations, indicating severe hepatobiliary damage. Five cattle in the Horowhenua developed photosensitivity after grazing turnips, although two weeks earlier they had also been grazing pasture with elevated *Pithomyces chartarum* spore counts. GLDH and GGT concentrations were elevated, which could have resulted from either sporidesmin or turnip toxicity. Rumination breaks open cells in the turnips releasing glucosinolates, and rumen enzymes cleave the bond between the glucose and the sinolate resulting in a toxic compound. The exact mechanism and pathogenesis of toxicity is unknown, although it is assumed hepatocellular and biliary damage leads to tertiary photosensitivity.

A small number of outbreaks of **polioencephalomalacia** occurred in mobs of four- to six-month- old calves in Southland in early autumn after rain resulted in lush pasture growth. Calves were either found dead or showed initial ataxia progressing to opisthotonos, recumbency and death over a 24-hour period.

Four 18-month-old heifers in a mob in Southland suffered severe weight loss, dehydration and diarrhoea over a short period. One animal that had a severely thickened colon on rectal palpation was destroyed. **Mucosal disease** was confirmed by the finding of typical histological changes in the distal small intestine and colon and a positive BVD Ag ELISA on serum collected antemortem. In another case MD was confirmed by positive BVD Ag ELISAs in two poor looking, six-month-old calves with diarrhoea in a mob of otherwise normal calves.

In many areas of Otago-Southland supplementary feeding of grain or turnips was used to maintain production in dairy herds over the dry February. Rapid feed changes in some herds led to outbreaks of **rumen acidosis.** This diagnosis was usually confirmed by the finding of very low serum bicarbonates.

Four mature cows were found dead over a 24-hour period on an extensive beef property in Central Otago. They had been in the same field for a week and at a time when plentiful rain after a dry spell resulted in lots of growth. As the survivors were driven off the field one cow was noted with dyspnoea. Necropsy of a survivor showed an emphysematous lung with interlobular oedema. Histopathological examination confirmed the diagnosis of atypical interstitial pneumonia, a condition associated with excess ingestion of L-tryptophan, which is converted to the toxic principal 3-methyl-indol in the lung, damaging pneumocytes. Death occurs from asphyxia. No further deaths occurred in the mob after it was moved. A mob of beef heifers in the Rangitikei was fed ryegrass pasture after a period grazing a Sulla brassica crop. Within two days one animal died and another died two days later. Postmortem examination showed diffuse reddening of the lungs and emphysema. The histological findings were consistent with **atypical interstitial pneumonia.** In another case an adult Angus cow grazing turnips developed pyrexia (40.2°C), grunting respiration and haematuria. Other cows grazing the crops also had haematuria. At necropsy there was marked pulmonary oedema and emphysema, and haemorrhage in bladder, pericardium and trachea. Histopathology of the lung revealed lesions of atypical interstitial pneumonia. This is unusual in animals grazing turnips, but has been recorded in the USA. Haemorrhage at multiple sites is also unusual. There was no evidence of malignant catarrhal fever; platelets were normal and in other cows with haematuria there was no evidence of anaemia. Perhaps another toxin from the turnips was interfering with coagulation.

A six-month-old Friesian bull from the Rangitikei had severe diarrhoea for two days before dying. Two other bulls and one sheep also died unexpectedly. A heavy growth of *Salmonella* Enteriditis was cultured from jejunal content, confirming **salmonellosis**. Histologically, severe enteritis, abomasitis and lymphadenitis were noted. The animals had been grazing fields previously flooded by overflowing waterways.

Yersinia pseudotuberculosis was cultured from faeces of five

separate cases from Taranaki involving calves or weaners with a history of chronic diarrhoea and weight loss.

A Friesian cow from Hawke's Bay aborted at six months of gestation. Multifocal regions of neuropil necrosis associated with light infiltrates of mononuclear cells visible on microscopy were most consistent with a diagnosis of ***Neospora* abortion.**

Several cases of **neoplasia** were diagnosed in the Palmerston North laboratory. Cutaneous and adult forms of **lymphosarcoma** occurred in two dairy cows. An 18-month-old Jersey heifer developed multiple 10-40 mm diameter skin nodules over a few weeks. A biopsy revealed a diffuse dermal infiltrate of neoplastic lymphocytes with a high mitotic rate of 20 or more per hpf. Cutaneous lymphoma is progressive, may wax and wane but culminates in the multicentric form of disease. A two-year-old Friesian had a sudden decline in milk production, then was found recumbent and died within a few hours. At necropsy the spleen and inguinal lymph node were enlarged, and abundant blood was present in the abomasal lumen. On histopathology these tissues and the abomasal mucosa were effaced by a neoplastic lymphocyte infiltrate. These findings are typical of the adult form of lymphosarcoma. Ulceration of the abomasal mucosa most likely led to haemorrhage and death through blood loss. An 18-month-old beef heifer in poor condition, had difficulty eating, bilateral exophthalmos, oral ulceration and epistaxis, and was euthanased. Nodular lesions were noted in the maxilla and ribs, where the bone was soft and broke easily. Histology revealed an anaplastic round cell population with hyperchromatic clumped nuclear chromatin suggestive of plasma cells in the bony sections, nasal and oral submucosa. Distribution of lesions, bony involvement and cytological features all suggested **multiple myeloma** as the most likely diagnosis.

A number of cases of **selenium deficiency** were diagnosed in the Hawke's Bay and Rangitikei districts. Typical histories included illthrift, diarrhoea, and failure to grow at the expected rate. Anthelmintic treatments were up to date or recently undertaken. Serum selenium concentrations ranged from < 37 to 130 nmol/l in 50-100% of animals sampled (140-1000 nmol/l adequate level).

Two one-year-old Jersey bulls died suddenly on a property where clostridial disease had been diagnosed in dead yearlings the previous year. Clostridial disease was suspected again, despite adequate vaccination. One carcass was markedly bloated and autolysing. The other was more recently dead and had a frothy nasal discharge. At necropsy the lungs were consolidated and firm with numerous nematodes visible in airways. The abomasum was diffusely oedematous. Histopathology confirmed oedema in the lungs and abomasum, along with a diffuse infiltrate of eosinophils suggesting a significant nematode burden as the underlying aetiology. Faecal egg counts of herd mates ranged from 100-12,300 epg confirming **verminous pneumonia.**

Deer

In Southland over February there were a number of small outbreaks of **copper deficiency** in five-month-old fawns, which showed signs varying from a stiff limbed gait to recumbency. In most cases serum copper levels were below the limit of detection.

Strong winds that blew all day across a large Otago deer farm caused the deaths of a large number of deer. Approximately 1,000 deer were in two adjoining fields; one held a large number of spikers and the other hinds and their fawns. All day the two mobs were seen running in circles around their fields, continuing all day and into the night. Next morning approximately 128 were found dead among some low scrub – the only shelter. Unusually most of the dead were hinds and only eight fawns and six spikers died. Necropsies of two showed few gross abnormalities apart from emphysematous lungs. Histopathological examination of a variety of tissues including skeletal muscle showed minimal changes and no evidence for a post-capture myopathy in the muscle sections. The cause of death was assumed to be a combination of **stress and exhaustion.**

On a South Otago deer farm a large mob of yearlings lost condition suddenly and became dull. Trace element testing on ten animals picked at random showed adequate serum concentrations of selenium and copper but Vitamin B12 concentrations were all <57 pmol/l, a surprisingly low level. All animals were injected with Vitamin B12 and the farmer reported a dramatic clinical improvement. However, as there were no controls it is difficult to report this as a **cobalt deficiency** problem. The serum Vitamin B12 concentrations were the lowest this laboratory has seen in deer.

Sheep

A few South Canterbury veterinary practices have dealt with ***Eperythrozoon ovis*** infection in Merino lambs. In one flock of 600, fewer than 10 lambs were affected. Initially a few were found dead. When moved between fields affected lambs lagged behind flockmates and some died – probably from hypoxia secondary to exertion. Clinically, affected lambs were pale and some degree of jaundice was apparent in the dead lambs. Blood smears collected from some had large numbers of haemoparasites consistent with *Eperythrozoon ovis.*

A number of cases of **polioencephalomalacia** in Southland in late February were mostly associated with lush pasture growth after rain. Small numbers of lambs and two-tooth ewes were generally affected but on one farm 20 of 500 good conditioned two-tooths break-fed on lush grass died over a short period. Most were found dead but the occasional live animal was found circling or recumbent.

A mob of stud ram lambs on a farm in Central Otago were mass-treated for pneumonia with an oral tetracycline at a dose rate of 12 mg/kg liveweight. A week later many had signs of photosensitivity with swollen droopy ears and swollen eyelids. Liver enzymes were

normal in the one animal tested. A **primary photosensitisation** caused by the antibiotic was the most likely cause, as the rams were on clean pasture and the farmer had noticed similar photosensitivity after tetracycline treatment in lambs the previous year. In that year ears had eventually dropped off many of the lambs.

An autumn check of a mob of 800 Romney two-tooths that had been mated as hoggets showed that approximately 60 had a severe unilateral or bilateral hindlimb lameness with marked wasting of the affected limb muscles. The cause was a severe **purulent arthritis** of the stifle. Culture of one affected joint was unremarkable, probably because of the chronic nature of the condition. The farmer had earlier noticed a few lame ewes at tailing. The ewes had been kept on pasture.

Twenty of a mob of 500 two-tooths on an Otago farm were found dead and 25 were depressed shortly after being moved into a field of young grass after shearing. Necropsy of two ewes showed brown blood, oedematous lungs and a full rumen. Although the pasture was not tested, the clinical and necropsy findings were consistent with **nitrate toxicity.**

On a small Otago sheep farm 43 hoggets were put to the ram and at scanning only two were diagnosed empty and a 136% lambing percentage predicted. Three aborted during pregnancy and one got in lamb after three cycles and eventually lambed in November. Twenty-seven hoggets lambed normal lambs (11 sets of twins), nine had **hairy shaker disease** (HSD) lambs with hairy birth coats, and one had a dead deformed lamb with arthrogryposis. The small twin HSD lambs mostly died soon after birth. The surviving HSD lambs were left with tails so their progress could be monitored. Two died before reaching slaughter weights but the remaining were eventually sent to the works after reaching slaughter weights. As these lambs got older they lost their hairy coats and apart from looking a bit smaller than the unaffected lambs they appeared normal. The normal looking ewe that lambed later in November produced a HSD lamb and she later tested positive as a HSD carrier. It is likely that this ewe had introduced the virus to this small flock of hoggets. Although this was a small outbreak it provided the opportunity for good data collection and information about the effect of the disease introduced to a group of susceptible ewes.

Numerous cases of **salmonellosis** were diagnosed throughout the Rangitikei, Wairarapa and Hawke's Bay regions. Typical histories included diarrhoea, anorexia, depression and death. Postmortem findings included intestinal congestion, watery mucoid intestinal content and widespread haemorrhages. ***Salmonella* Hindmarsh** was cultured from the intestinal content of all affected animals.

Ten seven-month-old lambs were dead and 80 sick from a mob of 400. A worm count on one dead lamb showed 42,400 *Trichostrongylus,* 1,600 *Ostertagia* and 1,200 *Nematodirus,* indicating significant **gastrointestinal parasitism** requiring appropriate anthelmintic treatment.

A property on the Coromandel Peninsula lost more than 20 lambs from a mob of 300 over a two-week period. Enterotoxaemia and haemonchosis were two of the differential diagnoses considered. However, at necropsy there was generalised pulmonary consolidation and congestion. Green fibrinous exudate and adhesions were evident throughout the pleural cavity and within the pericardial sac. Histology revealed a fibrinosuppurative bronchopneumonia and pleuritis with indications of a pre-existing enzootic pneumonia. Culture of fresh lung resulted in a heavy growth of *Pasteurella multocida* confirming **pneumonic pasteurellosis.**

Goat

An eight-week-old Saanen doe kid from Helensville north of Auckland presented with **polyarthritis** and a painful gait. Cytology on joint fluid revealed a neutrophilic arthritis with toxic change. No aetiologic agents were seen. Microbiological culture gave a pure growth of a putative *Mycoplasma* spp, which was referred to ESR for confirmation. NCDI subsequently identified it as a probable *Mycoplasma mycoides* LC isolate. The dam was from a goat herd in the Waikato previously investigated by MAF and found positive for *Mycoplasma mycoides* infection.

Alpacas

Two alpacas from the Manawatu region showed non-specific signs of not doing well. Blood samples revealed signs of anaemia, one non-regenerative, the other marginally regenerative. One animal had a marked eosinophilia and basophilia. Haematology repeated on the second animal 14 days later showed eosinophils had increased while basophils had decreased. On the day the second sample was taken another alpaca on the property died and postmortem examination showed 'a seething mass of parasites' in the gastrointestinal tract. A faecal sample had an egg count of 13,200 epg. The serious **gastrointestinal parasitism** possibly caused the eosinophilia.

A four-year-old alpaca hembra (female) was found dead in her field. She had suffered from **sporidesmin toxicity** two years previously but apparently recovered. Histopathological examination revealed severe hepatic cirrhosis and hepatic cord atrophy. Chronic hepatic insufficiency then hepatic failure would have led to death.

Pigs

Weaners in a Canterbury pig herd had reduced growth rate and putty grey diarrhoea. Histological examination of the colon revealed ***Serpulina pilosicoli.*** The pigs also had scattered single or small aggregates of multinucleated macrophages in the intestinal lymphoid tissue and mesenteric lymph nodes. Although there was no clinical disease to suggest post-weaning multisystemic wasting syndrome, these changes were suspicious for porcine circovirus 2 (PCV2) infection. PCV2 is common in New Zealand pig herds so

the possible histological evidence of its presence without clinical disease is not surprising. Tissues have been sent for immunohistochemistry testing for PCV2.

Donkeys

A nine-year-old donkey from Hawke's Bay with persistent severe watery diarrhoea was negative for *Salmonella*. A faecal egg count of 8,700 strongyloides epg confirmed ***Strongyloides infection.***

A 13-year-old female donkey from Hawke's Bay showed anorexia and depression after being treated with phenylbutazone for laminitis. Increased alkaline phosphatase (AP) of 968 U/l (reference range for horses 89-236), gamma glutamyl transferase (GGT) of 112 U/l (reference range for horses 12-68) and triglycerides of 20.7 mmol/l confirmed a diagnosis of **hyperlipidaemic syndrome.** The uncontrolled breakdown of body lipid following stressors such as laminitis or fasting causes insulin resistance because of release of stress hormones.

Dogs

A five-month-old heading dog pup had a one-month history of ill health and melaena with inappetence. Large numbers of coccidial oocysts present in the faeces were identified as *Isospora ohioensis.* Examination of faeces from a seven-year-old bitch with diarrhoea lasting for a week showed numerous coccidial organisms, suggesting a **coccidial infection.**

***Trichuris* infection** was diagnosed in three dogs. A faecal egg count revealed 2,200 *Trichuris* eggs per gram in an eight-year-old female spayed Siberian Husky with diarrhoea. An 11-year-old Kelpie cross with intermittent diarrhoea had 5,400 *Trichuris* epg. A mild hypoalbuminaemia was consistent with diarrhoea and gastrointestinal parasitism. An eight-year-old Papillon with diarrhoea had a *Trichuris* egg count of 2,450 epg. It had a mild hypoalbuminaemia and hyperglobulinaemia.

A healthy Golden Retriever was playing in surf retrieving sticks on a Kapiti Coast beach. It came out of the sea, had a convulsion and died. **Poisoning** was suspected. A postmortem examination showed some stomach contents in the trachea, and a small amount of effusion in the pericardium. The tissues were very autolysed. Histological examination of major organs including the brain did not reveal the cause of the death or the convulsions. Stomach contents were negative for 1080.

A ten-year-old Cavalier King Charles Spaniel presented with extensive scurfiness on the head. ***Cheyletiella*** was identified in skin scrapings. There is debate as to the importance of *Cheyletiella* in dogs, but infections can cause varying degrees of dermatitis with cutaneous exfoliation, pruritus and dandruff. People in contact may become infected.

Cats

A one-year-old domestic shorthaired female cat was presented with multiple draining subcutaneous nodules. Cytology revealed pyogranulomatous inflammation with numerous acid-fast organisms (most likely *Mycobacterium lepraemurium*) suggesting **mycobacterial infection.**

A number of cats had died in a Wairarapa town. A nine-month-old female spayed domestic shorthaired cat, which had been well the previous day, was presented at a veterinary clinic unable to stand, twitching, with a subnormal temperature of 36.8°C, and died overnight. Histopathological examination of the kidneys identified large numbers of oxalate crystals expanding renal tubules, typical of **ethylene glycol (antifreeze) toxicity**. Malicious poisoning was suspected.

Other

A young **pheasant** that died suddenly was thin with no fat reserves and had large amounts of clear peritoneal fluid with fibrin strands especially around the liver. The caudal vena cava and right atrium were markedly dilated and the liver enlarged. The heart had a 4 mm hole between the left and right ventricles just beneath the aortic valve, justifying a diagnosis of **ventricular septal defect.**

Illthrift and decreased egg production in a shed of 50-week-old **laying hens** was suspected to result from **fowl cholera.** Seven ill birds were euthanased and sterile swabs of liver and nasal mucosa collected immediately. *Pasteurella multocida* was cultured from liver swabs of three birds confirming the diagnosis.

Contact: Kerri Varney
Email: kerri.varney@gribbles.co.nz

Quarterly report of investigations of suspected exotic disease

Exotic disease investigations are managed and reported by MAF's National Centre for Disease Investigation (NCDI). The following is a summary of investigations of suspected exotic disease during the quarter from January to March 2004.

Vesicular diseases ruled out

A veterinarian reported two two-month-old calves with oral lesions on a lifestyle block in south Auckland. A mob of six calves was purchased at five days of age and the other four calves and ten adult cattle on the property were not affected. The two calves had been first noted as depressed ten and five days previously. The veterinarian described the oral lesions on the underside of the tongues as ulcers in an advanced stage of healing (granulation tissue in some lesions), and also noted heat around the coronary bands and elevated body temperature. There was no association with imported goods. Clinical and epidemiological evidence suggested the risk of exotic vesicular disease was very low. The veterinarian was directed to treat in accordance with his presumptive diagnosis (necrobacillosis and facial eczema) and to monitor with follow-up visits. The oral lesions continued to heal. Further inflammation of the skin on exposed areas of the face and head in combination with high pasture spore counts confirmed facial eczema as a component of the condition.

Vesicular disease was excluded by clinical examination of an eight-month-old steer. The steer had a single firm circular lump in the tongue and additional hard lumps in the chin. No vesicular lesions were present. A presumptive diagnosis of necrobacillosis was made. There were no other affected animals in the herd.

Transmissible spongiform encephalopathy ruled out

The cases reported in this section are the more significant suspected transmissible spongiform encephalopathy investigations for the quarter.

Brain from a four-year-old Friesian cow with a history of chronic neurological disease was examined. Vascular inflammatory lesions typical of malignant catarrhal fever were present throughout the brain. Bovine spongiform encephalopathy was excluded.

Numerous deer brains were examined, mostly from animals with illthrift. One case of malignant catarrhal fever was detected. Transmissible spongiform encephalopathy was excluded in each case.

A veterinarian reported a possible case of feline spongiform encephalopathy (FSE) after euthanasia of a 15-month-old Burmese cat with progressive central nervous signs. Histopathology of the brain and a sample of cervical spinal cord revealed a spongiotic encephalopathy with no features of prion-induced encephalopathy. Electron microscopy revealed intramyelinic oedema induced by endogenous or exogenous toxins. The most common cause of this lesion is hepatic insufficiency but other causes cannot be ruled out.

Bovine brucellosis ruled out

A bull serologically tested for *Brucella abortus* during semen export testing was found positive on CFT (titre of 1:8) and ELISA. Previous serology, undertaken routinely at six-monthly intervals, had been negative. A subsequent semen sample was negative for *B abortus* antigen by PCR. Serology repeated after a three-week period gave a negative CFT titre (1:4). The low initial CFT titre and its transient nature are consistent with a serological cross-reaction. These are reported to be becoming increasingly frequent, possibly because of the wider circulation of *Yersinia enterocolitica.* Faecal culture proved negative for *Y enterocolitica,* but the recommended pooled culture from in-contact animals was impossible as the bull was kept in isolation.

Exotic bovine theileriosis ruled out

A Hamilton clinical pathologist reported a case of suspected acute theileriosis in a 20-month-old steer. The steer had presented with a severe anaemia (regenerative) and a parasitaemia classified as 5+ (>50 per cent parasitaemia), and had died two days later. Postmortem examination showed air accumulation over the left dorsal ribcage, congested lungs, excess watery mucus in the airways and increased pericardial fluid, which partially clotted on exposure to air. Histopathology confirmed a haemolytic process consistent with erythrocyte parasitism by oriental theileriosis. No lesions suggestive of infection by the pathogenic *Theileria* species were evident. Molecular techniques determined the presence of *T buffeli/orientalis,* and suggested the possibility of concurrent infection with *T sergenti* although this finding remains inconclusive. A granulomatous enteritis indicated helmintic parasitism that probably contributed to the clinical signs. Haematology of the 87 in-contact steers, including a group of 17 from the farm of origin, showed all haematological parameters to be within normal reference ranges, with no significant difference between the group of 17 and the remainder of the in-contacts. Piroplasms were seen on light microscopy, but at levels considered insignificant. The severe clinical manifestation appears to have resulted from the interaction of benign theileriosis and helmintic parasitism.

Equine influenza, equine viral arteritis and equine infectious anaemia ruled out

A pathologist reported a horse with peripheral oedema and respiratory signs. Serum was negative for equine viral arteritis (EVA) using the virus neutralisation test (VNT) and negative for equine infectious anaemia (EIA) with the agar gel immunodiffusion (AGID) test. The submitting veterinarian

reported an upper respiratory condition in other horses on the property and in other clients' horses. An Exotic Disease Investigator visited the property to rule out equine influenza (EI). EI was not suspected on clinical and epidemiological grounds, and 12 blood samples and four deep nasal swabs were collected. Reactions to EI type 1 using the haemagglutination inhibition (HI) test were evident in all 12 sera, but there was no reaction to EI type 2. This raised suspicion of false positives, because EI viruses currently circulating worldwide are all type 2 viruses. Polymerase chain reaction (PCR) testing for influenza virus also revealed a preliminary positive band, although further PCR testing proved negative. While the laboratory reactions were investigated, a second visit to the original farm and to other farms in the area found no suggestion of EI on clinical or epidemiological grounds. Reactions to EI type 1 using the HI test were again evident in sera from all farms and in all population groups. No reaction to EI type 2 was found. The same range of HI reactions was also evident in a batch of ten control samples (sera previously submitted to NCDI for other testing). Virus isolation failed to detect EI virus. A slow growing herpes virus (EHV type 2 or 5) was isolated from a single nasal swab. EHV2 and 5 are considered ubiquitous and most equines are expected to have been exposed. EHV2 has been associated with mild respiratory disease in foals. The non-specific reactivity to EI type 1 using the HI test appears likely to have resulted from the use of gamma inactivated antigen. A laboratory investigation in collaboration with the World Reference Laboratory for Equine Influenza, Kentucky, USA, continues in an attempt to confirm this as the cause of non-specific reactivity. The PCR preliminary positive bands are believed to have resulted from lowering temperature settings to maximise sensitivity. The clinical condition probably resulted from an endemic viral upper respiratory tract infection (possibly EHV2) with secondary bacterial involvement in some individuals.

EVA and EIA excluded

A pathologist reported a horse with peripheral oedema. Its serum was negative for EVA and EIA using the VNT and AGID test, respectively. A blood smear examined under light microscopy for blood parasites was normal. The horse recovered without incident. The feeding of an unusual carbohydrate source was suspected as the cause of the oedema.

A pathologist reported a case of ventral abdominal and limb oedema in a recently imported Thoroughbred yearling filly. The horse was dull but with normal vital signs and appetite, and no respiratory involvement. No other horses in the establishment were unwell. Routine haematology revealed a mild anaemia and marginal leucopaenia. Acute and convalescent samples taken three weeks apart were negative for EVA and EIA using the VNT and AGID test, respectively. Haemoparasites were excluded after negative blood film and molecular screening. The horse made a full recovery within a few days and is likely to have suffered a mild form of purpura haemorrhagica.

A veterinarian reported ventral abdomen and limb oedema in two adult Arab horses. The horses had normal vital signs and appetite, and no respiratory involvement. Overseas movements to the property last occurred in 1996. Haematology revealed a mild anaemia in one horse and normal leucograms in both. Acute and convalescent serum samples taken three weeks apart were negative for EVA and EIA using the VNT and AGID test, respectively. The horses made a full recovery over the following seven days. The aetiology of the condition remains unknown.

A pathologist reported a 23-year-old pony with anaemia and an inflammatory leucogram. A blood smear did not reveal any blood parasites. The VNT was negative for EVA and the AGID test was negative for EIA.

A 34-year-old pony developed peripheral oedema. Serum tested negative for EVA with the VNT and negative for EIA with the AGID test.

Brucella canis ruled out

Blood samples from an 11-year-old German shepherd dog with a swollen testicle were submitted to a regional laboratory. Routine haematology and biochemistry were unremarkable. A serum sample was requested and was negative to the *Brucella canis* card agglutination test.

Ehrlichia canis ruled out

An *Ehrlichia canis* immunofluorescent antibody titre of 1:80 was found during routine pre-export testing of a dog, which was not a suspected clinical case. No clinical pathological features of canine ehrlichiosis (non-regenerative anaemia, thrombocytopaenia, pancytopaenia, lymphocytosis, or hyperglobulinaemia) were present. However, enquiries revealed that the dog was imported from Western Samoa three years previously and had tested positive on arrival in New Zealand. A PCR test was negative and a pathologist identified no morulae or other *Ehrlichia canis* stages in the Wright's stained blood smear.

Exotic systemic mycosis excluded

A pathologist reported oval intracytoplasmic structures within degenerate macrophages in a cerebrospinal fluid (CSF) sample from a five-month-old Bengal cat. The cat had a history of intermittent fever and neck pain and had been on therapy for toxoplasmosis and mycotic infection. Haematology, biochemistry and radiography revealed no abnormalities. No fungi or yeast were isolated on CSF culture, the latex agglutination test for cryptococcus antigen was negative, and toxoplasma antibodies were not identified in two samples taken three weeks apart. The cat was euthanased following a poor response to anti-fungal therapy. Necropsy showed marked generalised non-suppurative meningoencephalitis and myelitis, and multifocal nonsuppurative lymphadenitis and epicarditis. The oval structures seen on CSF tap were not identified and no fungi were visible using special staining techniques. No yeast, fungi or bacteria were cultured from a

brainstem sample. Immunohistochemistry revealed no evidence of involvement of feline coronavirus. Idiopathic non-suppurative meningoencephalitis was diagnosed.

Newcastle disease and avian influenza ruled out

A veterinarian contacted the 0800 number when informed of sudden death in a group of ducks on a client's farm. The ducks were found dead adjacent to an effluent pond and all appeared to have died without a struggle. Histopathology and virus isolation on three ducks sent to NCDI for necropsy ruled out avian influenza and Newcastle disease. A person on the property has subsequently suggested the birds may have ingested poison meant for killing magpies. The provisional diagnosis is alpha chloralose poisoning.

Five of 16 cage birds of various species died over a ten-day period. Three were necropsied at Massey University. Pneumonia was identified in two and tracheitis in one bird. Fungal culture identified *Aspergillus* and *Penicillium* in varying amounts from two birds. Two birds were sent to NCDI for the exclusion of exotic disease. Necropsy showed no gross lesions and there was no evidence of exotic disease on histopathology. Bacteriology revealed only commensals or contaminants, and no mycoplasma or chlamydia were isolated. Virus isolation ruled out avian influenza and paramyxoviruses. No further birds died. Whether the birds suffered a primary fungal respiratory disease or whether this was secondary to an unidentified insult remains unknown.

Exotic mites of bees ruled out

An AgriQuality apiary officer found signs consistent with tracheal mites in dying honeybees. A sample of bees sent to the National Plant Pest Reference Laboratory was positive for the varroa mite (*Varroa destructor*), but negative for *Tropilaelaps clarea*, tracheal mite (*Acarapis woodi*) and small hive-beetle (*Aethina tumida*). The bees were considered most likely to have died from insecticides.

Viral haemorrhagic septicaemia in marine fish investigated

A fisherman reported extensive muscle bleeding in one of four fish caught in the Hauraki Golf. Enquiries revealed that local fish processors occasionally see muscle haemorrhage in a variety of fish species. An Exotic Disease Investigator visited fishermen and processors in the area to investigate the report and to rule out viral haemorrhagic septicaemia. Because of bad weather no fish could be caught, but no further evidence of muscle bleeding was found at the fish processors. A surveillance procedure was established to enable fish processors to report any similar findings.

Matthew Stone
Team Leader, Exotic Disease Investigations
National Centre for Disease Investigation
MAF Operations
Email: matthew.stone@maf.govt.nz

Correction

In the article on chain springs on leghold traps on page 19 of the March 2004 edition of *Surveillance* (Volume 31, no 1) the caption for Figure 3 was incorrect. The trap shown was a **Lanes Ace gin trap.** The editor apologises to the author and readers for the error.

Ministry of Agriculture
and Forestry

Te Manatu Ahuwhenua,
Ngaherehere

Veterinary Diagnostic Laboratories

- Gribbles Veterinary Pathology Auckland
  PO Box 41
  AUCKLAND
  Tel: 09 526 4560 Fax: 09 526 4569

- Gribbles Veterinary Pathology Serology
  PO Box 536
  PALMERSTON NORTH
  Tel: 06 356 7082 Fax: 06 357 1904

- Gribbles Veterinary Pathology Palmerston North
  PO Box 536
  PALMERSTON NORTH
  Tel: 06 356 7100 Fax: 06 357 1904

- Gribbles Alpha
  57 Sunshine Ave
  PO Box 195
  HAMILTON
  Tel: 07 850 0777 Fax: 07 850 0770
  Freephone 0800 367 257

- LABNET Invermay Ltd
  PO Box 371
  MOSGIEL
  Tel: 03 489 4600 Fax: 03 489 8576

- LabWorks Animal Health Ltd
  PO Box 113
  Lincoln University
  LINCOLN
  Tel: 03 325 3636 Fax: 03 325 3630

MAF

Ministry of Agriculture and Forestry
Te Manatū Ahuwhenua, Ngāherehere

Animal Disease Emergency

To report suspected exotic diseases in animals, please phone toll free, all hours 0800 809 966

National Centre for Disease Investigation

MAF
PO Box 40 742
UPPER HUTT
Tel: 04 526 5600 Fax: 04 526 5601