

biosecurity

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MAF
Biosecurity

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biosecurity is published by MAF Biosecurity Authority, and covers biosecurity and animal health issues. It is of special interest to all those with a stake in New Zealand's animal production industries.

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Fragile ecosystems facing threat?



At MAF's SPS seminar, Dr Oliver Sutherland pointed out the potential environmental impacts of international trade.

Biodiversity in New Zealand

New Zealand was the last substantial landmass to be settled anywhere in the world, only about 1,000 years ago. And prior to that it had been isolated for many tens of thousands of years from Gondwanaland.

As a result of that lengthy period of isolation we have a unique assemblage of species. In fact, over 90% of our species are endemic: they're found no where else in the world. That includes both our species of bat; we didn't have any mammals in New Zealand prior to the arrival of humans other than three species of bat, of which one has become extinct. All four frog species are endemic, all 60 reptiles, a quarter of all of our birds, over 90% of all of our invertebrates and 80% of our vascular plants.



(Just by comparison with these thousands of species found nowhere else, in Great Britain there are just two endemic species: one plant and one animal.)

These species, of course, are assembled into ecosystems. These are not significant just in terms of their conservation and biodiversity values. They provide ecosystem services such as pure water, nutrient cycling, soils, waste decomposition and so on, that underpin primary production.

And you can put a figure on these values. In 1997 indigenous biodiversity was valued at \$230 billion per year, more than twice the GDP of \$84 billion in that year. And although you can't

easily put a figure on it, of course our clean green environment is what underpins so much of our primary production and our tourism, which we market relentlessly.

Threats to biodiversity

New Zealand, as well as being the last land to be settled, has the worst record of biodiversity loss. A major threat to biodiversity in New Zealand was the arrival of the first humans. By the year 1600, about 600 years after the first settlement by Maori, 33% of our indigenous forests had gone. By 1990, 66% of our indigenous forests had been cleared, and there had been extensive modification of wet lands, dune lands and coastal areas.

Meanwhile we have gained 31 species of exotic mammals, 24 of which have become major pests; particularly possums, rabbits, stoats, ferrets, goats, horses, six species of deer, and wallabies. We have introduced some more within the past few years including, most recently, chinchillas, which are not pests yet but may be.

We have also had 200 species of invasive weeds introduced. And a statistic that I think is worth remembering is that since the early 1800s, one new plant species has become naturalised in the Auckland region every 80 days.

One of the ways in which this happens occurred to me not so long ago. I received in the mail an envelope airmailed from the United States as a trade promotion. The trade promotion was addressed to me not at Landcare Research but Landscape Research. The promoters had gone through the internet and got all the addresses that seemed to have Landscape in it, and they sent me some products that "would preserve landscape value and stop soil erosion."

The envelope included a packet of seeds called *Plantago insularis*. It turned out the 200 seeds in this little packet, which I still have in my office, are of a species that is not in New Zealand. When we did a risk analysis on that species we found that it would be a substantial weed risk if it were ever grown in New Zealand. I, along with a whole lot of other people, just got it in the mail.

Impacts on species

In the past 700–800 years nearly one third of our endemic land-based birds have become extinct. Eighteen percent of our endemic sea birds have become extinct. Insects, frogs, reptiles and a bat, and in fact 1,000 of our known animal, plant and fungi species today, are threatened, if not

endangered. We have had this extraordinary history of loss of biodiversity as a result of impacts largely through the arrival of humans.

Exotic disease or pest threats posed by international trade

This is the backdrop against which we discuss the threats of exotic diseases and pests posed by international trade.

Endemic plants can clearly be affected through imported primary produce of all sorts; ornamental plants and other goods carrying exotic pest eggs, larvae, and adults.

Endemic birds can be put at risk through imported poultry products and/or stock, and new avian species and/or their genetics. I refer particularly here to ostriches and emu. Even though in New Zealand we do have ostriches and emu, we may lack at the moment the vectors that could transmit their diseases to some of our native birds. These vectors could be introduced.

Looking at reptiles, there is a continuing wish to trade in pet and recreational species of turtles, tortoises and lizards. The endemic crustacea, especially our freshwater crayfish, and other invertebrates, may be threatened through imported chilled and frozen processed foods. New aquaculture species pose a potential risk to indigenous crustacea and invertebrates.

There is also a risk to humans and other endemic biota simply through imported insect vectors; mosquitoes for instance that can arrive and threaten public and animal health.

Phytophthora

A concrete example that these risks are real is Phytophthora, a well-known root-rotting pathogen of commercial plants. Recently in Australia, and also North and South America, *Phytophthora cinnamoni* has devastated native plant biodiversity. There are widespread virulent strains in Australia, possibly of south-east Asian origin. It attacks over 130 non-commercial native species in Tasmania, some of which are members of families that occur in New Zealand.

Phytophthora cinnamoni is also present in New Zealand, although we don't have the particularly virulent strains. But under the SPS agreement I guess we could say that we have it in New Zealand so there is no need to look for it in ornamentals that might be imported with roots, soil or artificial soil with the vermiculite

attached. So there's very real risk that I don't think is being considered in respect of *Phytophthora* and, no doubt, other diseases that could affect our native plants.

Cabbage tree

One national icon recognisable to most New Zealanders is the cabbage tree. But it's not so beautiful when being attacked by cabbage tree sudden decline. The story of this brings us back into a New Zealand context.

Cabbage tree sudden decline has been noticed in New Zealand in about the past 20 years. It causes rapid decline and death of trees. But it took the best part of 12 to 15 years for scientists to determine that it was caused by transmissible phytoplasma.

Phytoplasmas are organisms that are very difficult to detect and will be difficult to find on traded ornamentals and other plants coming into New Zealand. The phytoplasma affecting cabbage trees is transmitted by another exotic species (a leafhopper that came probably from Australia), but perhaps of more worrying significance is that phytoplasma has a wide host range which includes commercial species in Australia.

The point here is that there are some quite substantial concerns we could have about plant diseases that are very hard to detect, getting into New Zealand either through trade in ornamentals or trade in primary produce.



Kiwi

The kiwi is a national icon for New Zealanders like no other. We have three species of kiwi; all of them are threatened and two probably endangered. And I believe there may be a risk to kiwi from non-host specific viruses of ostrich and emu.

Before I go on I want to refer to the extreme measures that New Zealand took, measures I don't think were necessarily justifiable scientifically, to test whether or not rabbit calicivirus disease was going to be a threat to kiwi. Many virologists, and perhaps most scientists, would not have thought there was really much of a risk to kiwi from rabbit calicivirus disease. But there was an immense amount of publicity causing experimentation done to determine that there would be no risk.

There wasn't such extraordinary care taken when emu and ostriches, which are ratites in the same family as kiwi, were brought into New Zealand. And I think that in relation to the diseases of those birds cross-species changes in disease manifestations are going to be very difficult to predict before such new species are introduced.

Conclusion

Where does all this get us with the SPS agreement? The wording of the SPS agreement is certainly wide enough to cover any threat to any plants, animals and indeed to the New Zealand environment. But you don't have to look very far to see that the implementation of the SPS agreement has had a very clear focus on the agricultural and horticultural sectors.

I think it is time now, perhaps even overdue, for an explicit concern for the potential environmental impacts of international trade.

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Biosecurity research strategy



Comments are invited on areas for biosecurity-related research in New Zealand.

The Biosecurity Council has prepared a draft document outlining areas for biosecurity research in New Zealand. The document appears below. The council is seeking comment on this document.

The document is intended to provide guidance to those who manage, fund and undertake biosecurity-related research, to help ensure a more integrated and consistent approach to such research in New Zealand.

The strategy outlines the principles that underpin biosecurity research, the objectives for that research in this country, and the areas in which biosecurity research should focus.


These areas are divided into those of general interest across all aspects of biosecurity, and those that are focused on pre-border (i.e. outside New Zealand), at the border, and post-border activities. The latter includes the management of pests that are newly discovered as well as those that are long established in this country.


The document, when finalised, will be given to the Foundation for Research, Science and Technology to assist them with their decisions

on the allocation of Crown funds for biosecurity-related research. It will also be used by the four departments with operational responsibility for biosecurity (Agriculture and Forestry, Conservation, Fisheries and Health) to assist them with their biosecurity research decisions.

The Biosecurity Council is an advisory body to the Minister for Biosecurity and was established to provide a forum for discussing biosecurity issues among the various departments with biosecurity responsibilities (Biosecurity 10: 4).

One of the functions of the council as specified in its terms of reference is to coordinate biosecurity-related research. This includes both research funded by the Crown through the public good science fund and operational research conducted by the biosecurity departments.

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 The deadline for submissions is 29 February 2000

DRAFT



Biosecurity research areas for New Zealand

Introduction

This document outlines an overarching biosecurity research strategy for New Zealand. It is intended to provide guidance for those who manage, fund or undertake biosecurity research, and to help ensure a more integrated and consistent approach to research among the many agencies involved in biosecurity.

Maintaining the biosecurity of New Zealand's land and marine and fresh waters is of crucial importance for all our citizens and for our economic well-being as a small island nation. The growth in trade and tourism, intensification within production systems, and climatic and environmental changes all increase the risks posed by new and already established destructive organisms. The strategy addresses research relating to pre-border and border

biosecurity and post-border pest management. Sound biosecurity-related research is essential for minimising these threats and protecting New Zealand's biosecurity.

Definition of biosecurity¹

Protection from the risks posed by organisms to the economy, environment and people's health through exclusion, eradication and control

Vision for biosecurity¹

Protecting New Zealand's biodiversity

Mission for biosecurity research

Biosecurity-related research that meets New Zealand's needs

Principles

The following principles underpin this biosecurity research strategy:

- Research targeted at highest priority areas
- High quality research that has practical benefits for biosecurity
- Consistent decision-making between agencies about investment in research that reflects risks to New Zealand (including the risk of not knowing)
- Integration of research done by different agencies and sectors. (This includes ensuring coordination/synergy between operational and PGSF (public good science fund) research.)
- Research activities are consistent with the principles of the Treaty of Waitangi
- Sharing research results

Objectives for New Zealand biosecurity research

The nature of biosecurity means that biosecurity research will need to support a wide range of biosecurity activities that occur pre-border, at the border, and post-border, and are undertaken by, or directly affect, multiple agencies and sectors. Decisions about biosecurity research therefore need to recognise multi-agency interest. Since New Zealand has historically been more focused on the primary production and health sectors, there is relatively good knowledge about those sectors and the threats to their biosecurity. There is relatively poor knowledge about many other sectors, particularly in the marine and conservation areas. Decisions about biosecurity research will need to take into account the varying levels of knowledge of different environments and different sectors.

Biosecurity research should achieve the following objectives:

- Better information on which to make biosecurity decisions at all levels (pre-border, at the border, post-border)
- Better management tools for biosecurity at all levels
- Better understanding of social and cultural (as well as biological) factors in biosecurity
- Timely access to high quality research skills for biosecurity
- New Zealand taking its place in the international community (including supporting international liaison/coordination and enabling relevant international obligations to be met)
- Communication of research issues and results to interested and affected parties

Areas for biosecurity research

To achieve the objectives of this strategy, and to assist those deciding to fund or undertake biosecurity research, the areas in which biosecurity research should be focused need to be specified. The agencies involved in biosecurity management in New Zealand have identified these areas for New Zealand. They are listed below. Research undertaken in these research areas could be either generic biosecurity research or more sector-specific research.

General

- Analysis of economic and political models for the management of biosecurity threats
- Developing rapid-access information systems, collections and environmental databases on unwanted organisms

Pre-border

- Identifying threats to ecosystems
- Profiling and modelling the characteristics of damaging or potentially damaging organisms
- Identifying controls (in the country of origin) for selected organisms that potentially pose a major threat to New Zealand
- Analysing and predicting risk pathways for unwanted organisms
- Identifying and collating databases and expertise on unwanted organisms; developing systems for rapid access to appropriate data
- Developing compliance validation methodologies
- Identifying and locating biosecurity-related risks to animal, plant and human health

Border

- Developing improved unwanted organism interception technologies and sampling methodologies
- Developing border containment and eradication methodologies for unwanted organisms
- Developing profiles of non-compliance behaviour to biosecurity requirements

Post-border

- Developing rapid identification techniques for unwanted organisms
- Designing and developing methodologies for undertaking delimiting surveys for new incursions
- Developing rapid response options for potential incursions of unwanted organisms
- Analysis of public attitudes and perceptions of biosecurity risks and barriers to biosecurity responses

- Developing long-term containment and control strategies
- Developing surveillance and monitoring methodologies for baseline assessment and assessment of any management tools
- Developing methodologies to assess the impact of unwanted organisms

Implementation

This strategy will be implemented through the following mechanisms:

- Agencies represented on the Biosecurity Council will consider their biosecurity research plans within the context of this strategy so it is consistent with the principles, objectives and priorities of this strategy
- The Foundation for Research, Science and Technology is encouraged to create a biosecurity reference group, which includes Biosecurity Council representation, to monitor progress of the strategy
- The strategy will be reviewed, with full consultation, after three years.

¹ The definition and vision statements are interim, depending on the final form of the document "Towards a biosecurity strategy for New Zealand" dated 5 October 1999.

Plans to enhance laboratory diagnosis of exotic diseases in New Zealand



MAF aims to shorten the time taken to identify potential exotic disease agents in the laboratory by providing safe, reliable, accurate screening tests at the National Centre for Disease Investigation near Wellington.

MAF is commissioning a new physical containment level 3 (PC 3) laboratory at Wallaceville. This will enable the National Centre for Disease Investigation (NCDI) to handle samples containing suspect exotic organisms and carry out screening tests for exotic diseases in New Zealand, without the risk of disease agents escaping into the environment.

The most effective use of the facility will be achieved when test methods are introduced and validated in advance of any potential incursion. This will ensure that screening tests are immediately available when investigation of a suspected disease incursion is needed.

Rapid identification of potential exotic disease agents is critically important for deciding on control actions to contain exotic disease incursions. MAF aims to speed up the diagnosis of exotic diseases in New Zealand by providing safe, reliable, accurate screening tests at the NCDI. This development will reduce New Zealand's reliance on overseas laboratories for exotic disease testing.

Reliable test performance requires staff practised in the test methodology and the use of both positive and negative control samples. MAF's intention is to source killed antigens or non-infectious nucleic acid sequences for these purposes wherever possible. However, in some cases the live infectious agent will be required as a positive control to validate the test.

NCDI staff have begun preparing an application to the Environmental Risk Management Authority (ERMA New Zealand) for approval to import a range of exotic organisms into containment (see list below). This application will include an analysis of the risks associated with importation of these organisms, the steps taken to mitigate these risks, and the benefits of more rapid diagnostic procedures. Approval will also be sought to retain stocks of organisms causing previously endemic diseases that have been eradicated (e.g. Aujeszky's disease virus).

As described in Biosecurity 15: 3-4, a physical containment PC3 containment laboratory has been constructed at the NCDI. The use of this laboratory will minimise the risks of escape of organisms.

Current situation

At present, some exotic disease testing is done at MAF's low-security PC 2 laboratory at Wallaceville near Wellington, but most testing is

carried out at reference laboratories in the EU, USA or Australia.

International transport of diagnostic samples is becoming more difficult because of increasingly stringent regulations of the International Air Transport Association (IATA). International transport also requires approval from the governments of countries en-route for exotic disease samples to be carried through their airspace. Despite pre-arranged approvals and courier procedures there have been substantial delays with some shipments.

On arrival at the off-shore laboratory the priority and speed of testing, and the test results themselves, are out of New Zealand government control. Consequently, New Zealand may have to wait several weeks before an exotic disease can be ruled in or ruled out.

For example, when porcine reproductive respiratory syndrome virus (PRRS)-positive sera were detected in a group of pigs in quarantine, it took five weeks to get confirmation of our test results from Australia and another five weeks for proof of their seronegative status from the reference laboratory in Holland. This time could have been reduced to about two weeks if viable PRRS virus were held in containment in New Zealand.

Additional delays are likely to be experienced if New Zealand has to use overseas laboratories to demonstrate that a zone or the whole country is free of an exotic disease during and after an outbreak. Overseas reference laboratories will be unable to provide speedy results on the large numbers of samples that must be tested for these purposes because of commitments to their own needs.

Were the test to be introduced to the NCDI after the disease incursion, a delay of at least three months could be expected to obtain seed stocks of known strains of the micro-organisms, prepare reagents and introduce the test. Validation of the test to OIE standards would take several months more.

Exotic disease diagnosis

Speedy and accurate diagnosis is the key to effective disease control. This starts with early reporting of unusual disease events even when the probability of the disease being exotic is low. Farmers, veterinarians, and concerned members of the public are encouraged to report unusual disease events through MAF's freephone

number, 0800 809 966, which operates 24 hours per day, 7 days per week, every day of the year.

Reporting must be followed by rapid clinical, pathological and epidemiological assessment of the disease in the field and speedy laboratory confirmation of the causative agent.

Quick diagnosis of an infectious disease results in a smaller number of infected animals and a smaller number of infected properties to deal with, which in turn means smaller quarantine zones, increased opportunities for maintaining disease-free zones, quicker disease eradication, and decreased outbreak cost overall.

Calls to MAF's freephone initiate an investigation tailored to the disease suspected. When a highly contagious disease like foot and mouth disease is suspected, a local veterinarian with expertise in exotic disease diagnosis is despatched to provide a rapid initial assessment. If this investigator cannot rule out an exotic disease, or where an unusual but less contagious disease is reported, exotic disease investigators and microbiologists from the NCDI are despatched to carry out a detailed investigation.

Test validation

For an exotic disease investigation to be internationally credible we must not only rule-in or rule-out the suspected exotic disease on the basis of clinical observations, but also reach a definitive laboratory diagnosis wherever possible. The NCDI relies on careful monitoring of test performance, comprehensive quality standards (ISO 17025) and participation in international inter-laboratory comparison programmes to ensure test accuracy and international acceptance of our test results.

Accredited test methods require the use of positive control materials to validate tests. Positive control materials are also essential for staff training to provide the familiarity with exotic organisms necessary to ensure tests to detect exotic organisms or antibodies against them are immediately functional when required.

Exotic organisms required to validate tests

Actinobacillus pleuropneumoniae (exotic strains)
Aeromonas salmonicida
avian infectious bronchitis virus (exotic strains)

avian influenza (types H1 to H15)
avian paramyxovirus (types 2 to 9)
Bacillus anthracis
bluetongue virus (attenuated tissue culture strain)
Borna disease virus
bovine ephemeral fever virus
Chlamydia psittaci ovis
classical swine fever (virulent strains)
Cytophaga psychrophila



duck hepatitis Type 1 virus (type virus)
enterovirus (encephalomyelitis reference strains)
equine influenza virus (type A)
Flavobacterium branchiophila
Flexibacter (F. maritimus, F. psychrophilus)
herpes virus of pilchards
infectious bovine rhinotracheitis virus type 1.1 (abortifacient strain)
infectious bursal disease (virulent field strains)
infectious pancreatic necrosis virus (exotic strains)
Lactobacillus piscicola [Carnobacterium]
Leptospira spp. (exotic serovars)
lymphocytic choriomeningitis virus
maedi-visna virus
Marek's disease virus (exotic strains)
Melissococcus pluton (European foulbrood)
Mycobacterium spp. (exotic strains)
Mycoplasma iowae
myxomatosis virus

Newcastle disease virus, PMV1 (mesogenic and velogenic viruses)
orbiviruses (epizootic haemorrhagic disease of deer, Ibraki disease viruses, equine encephalosis)
oncorhynchus masou virus
pancreas disease virus of salmon
Pasteurella multocida B:2 E:2; toxigenic atrophic rhinitis strains
Photobacterium damsela subsp. piscidia [Pasteurella piscicida]
Piscirickettsia salmonis
porcine haemagglutinating encephalomyelitis virus
porcine reproductive and respiratory syndrome virus
Pseudomonas pseudomallei
Salmonella spp. (exotic, reference strains of exotic species and their phages)
swine influenza virus
Streptococcus spp. (aquatic strains)
Taylorella equigenitalis
transmissible gastroenteritis virus
transmissible spongiform encephalopathy agents (scrapie, BSE, chronic wasting disease of elk)
Vibrio salmonicida, V. carchariae, V. alginolyticus, (shellfish strains)
Viral nervous necrosis virus
Yersinia ruckeri (exotic strains)

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i Derek Belton, Programme Manager (Surveillance & Disease Response), phone 04 474 4755, beltond@maf.govt.nz

update

Draft import health standards for consultation

The following draft import health standards have been developed by MAF and are available for public consultation.

Primates from Australia
 Agouti from Australia
 Tortoises from Australia
 Madagascan giant day geckos from Australia

MAF has received applications from various New Zealand zoological gardens to import these animals.


Ruminant protein

Import health standards for products that contain or were exposed to ruminant protein, and could subsequently come into contact with ruminant animals in New Zealand, are being amended to meet the requirements of the Biosecurity (Ruminant Protein) Regulations 1999 (Biosecurity 16: 5).

About 30 existing import health standards are affected, along with several draft standards.

 Jean-Marie Derouet, Technical Adviser, International Trade (Animal Biosecurity), phone 04 498 9897, derouetj@maf.govt.nz

 <http://www.maf.govt.nz/AnimalIHS>

 The deadline for submissions is 15 March 2000

New import health standards issued

The following new import health standards (IHSs) have been issued by the Director of Animal Biosecurity and are available for use. Any previous IHSs covering these combinations of country of origin and commodity species have been revoked.

Caribbean flamingo (*Phoenicopterus ruber ruber*) and Greater flamingo (*Phoenicopterus ruber roseus*) hatching eggs from the United Kingdom, Australia and Canada into zoological gardens

This standard was notified for consultation in Biosecurity 14: 8.

Preserved animal specimens from all countries

Clause 6.1 of this standard has been revised to include microscope slides of animal tissue.

Equipment used with animals

This now reflects the current format for IHSs.

Ornamental animal products from all countries

Clause 6.4 has been added to clarify the requirements for the importation of articles manufactured from polished and treated horn or such other animal products. Clause 6.5 has been added to include requirements for the importation of blown eggs.



Caviar from all countries

Revision to clarify importation requirements.

Sheep and goats and their genetic material from Australia

Following New Zealand's recognition of South Africa being scrapie free (Biosecurity 16 :7), clauses referring to animals being born in South Africa and imported into Australia have been deleted from the following import health standards:

Goats from Northern Australia; Goats ex Southern Australia; Goat embryos ex Australia; Goat semen ex Australia; Sheep ex Northern Australia; Sheep ex Southern Australia; Sheep embryos ex Australia; Sheep semen ex Australia

 Kerry Mulqueen, National Adviser (Import Management), phone 04 498 9625, fax 04 474 4132, mulqueenk@maf.govt.nz
 www.maf.govt.nz/AnimalIHS

Ruminant protein regulations: correction

Manufactured stock feeds and rendered meat and bone meals must be labelled under the ruminant protein regulations by 1 May 2000, not 1 April as advised in Biosecurity 16: 5.

The Biosecurity (Ruminant Protein) Regulations 1999 came into force on 1 January 2000. Consequent changes to import health standards are outlined on this page.

From 1 May 2000 most pig and poultry feeds and organic fertilisers, such as blood and bone, that contain ruminant protein must carry a label that prohibits feeding to ruminant animals. By 1 April 2001, feeds that are suitable for ruminants may only be labelled as such if they are produced in a mill that operates a registered ruminant protein control programme.

 Ashley Edge, Policy Adviser, Biosecurity Policy Coordination, phone 04 474 4213, edgea@maf.govt.nz


Photo credit: PHOTOSOURCE Image Library NZ Ltd cover, page 2.

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International animal health regulations

These animal health regulations have been either proposed or implemented by members of the World Trade Organization, and have been notified under the SPS agreement (the WTO agreement on the application of sanitary


and phytosanitary measures) between 1 December 1999 and 12 January 2000.

 Keawe Woodmore, Technical Adviser, International Agreements, phone 04 474 4226, sps@maf.govt.nz

Country	Reference	Date notified	Summary of content	Comments deadline
Chile	51	8/12/99	Pig fat, edible pig skin and unprocessed bovine	15/12/99
EEC	76	14/12/99	Dioxins in kaolinitic clay	n/a
Iceland	1	16/12/99	Non-heat treated meat and meat products	10/5/99
Pakistan	1	6/1/00	Dioxin in animal products from Belgium	n/a
Philippin	16	17/12/99	Buffalo meat from India	8/1/00
USA	214	7/1/00	African swine fever in Portugal	n/a

How to contact us

Everyone listed at the end of an article as a contact point, unless otherwise indicated, is part of the Ministry of Agriculture and Forestry Biosecurity Authority. The group within the authority to which they belong is also identified.

 All MAF staff can be contacted by e-mail, and the standard format for all addresses is surnameinitial@maf.govt.nz. For example, Ralph Hopcroft would be hopcrofr@maf.govt.nz (There are slight exceptions for people with similar names, but these addresses are given where necessary.)



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