Ministry for Primary Industries
Manatū Ahu Matua

Risk Management Proposal

Poultry Hatching Eggs & Specific-Pathogen-Free Chicken Eggs

24 July 2015

New Zealand Government

Growing and Protecting New Zealand

Disclaimer

This risk management proposal does not constitute, and should not be regarded as, legal advice. While every effort has been made to ensure the information in this document is accurate, the Ministry for Primary Industries does not accept any responsibility or liability whatsoever for any error of fact, omission, interpretation or opinion that may be present, however it may have occurred.

Requests for further copies should be directed to:

Ministry for Primary Industries (MPI)
Regulation & Assurance
Animal Imports
PO Box 2526
WELLINGTON 6140

Email: animalimports@mpi.govt.nz
Telephone: 04 890 0134
Facsimile: 04 894 0733

Contents

Purpose

The purpose of this document is to:

- Show how options for the management of risk organisms have been assessed; and
- Provide recommendations for import requirements for the generic import health standard (IHS) for poultry hatching eggs and specific-pathogen-free (SPF) chicken eggs.

The IHS for poultry hatching eggs and SPF eggs from chickens has been developed under Section 24A of the Biosecurity Act 1993.

For a detailed analysis of potential hazards and management options refer to the following Import Risk Analyses (IRA) (available on the MPI website http://mpi.govt.nz/importing/overview/import-health-standards/risk-analysis/):

- *Import Risk Analysis: Hatching Eggs from Chickens (Gallus gallus) from the European Union, Canada, the United States of America, and Australia, 28 January 2009* (IRA 2009)
- *Import Risk Analysis: Hatching Eggs of Domestic Ducks (Anas platyrhynchos domesticus and Cairina moshata) from the European Union, Canada, the United States of America, and Australia. February 2012* (IRA 2012)
- *Import Risk Analysis: Turkey Meat, May 2010* (IRA 2010)
- *Import Risk Analysis: Turkey Rhinotracheitis Virus in Turkey Hatching Eggs from the United Kingdom Sourced from TRT- Vaccinated Flocks, February 2004* (IRA 2004)
- *Import Risk Analysis: Avian Paramyxovirus Type 1 in Hens' Hatching Eggs 2001* (IRA 2001)
- *Rapid Risk Assessment: Mycoplasma in Turkeys, March 2014* (RRA 2014)

Background

The IHS for poultry hatching eggs and SPF chicken eggs came into force in January 2013. This IHS will replace the individual IHSs for chicken and turkey hatching eggs and SPF chicken eggs from specified countries as new veterinary certificates are negotiated, these negotiations are still underway.

The generic IHS serves as the basis for country-to-country (bilateral) negotiations with countries considered in the current risk analyses. MPI and the Competent Authority of the exporting country will negotiate the content of the veterinary certificate to determine how the requirements of the IHS will be met. Negotiations will take into account the disease status in the exporting country, the national systems, legislation and standards in the exporting country for regulation of the poultry industry, and the capabilities and preferences of the Competent Authority.

A guidance document provides additional guidance material and contains a model veterinary certificate for trade in hatching eggs and SPF eggs and links to country-specific negotiated veterinary certificates.

Objective

The objective is to manage all biosecurity risks posed by the import of poultry hatching eggs and SPF eggs, consistent with New Zealand's domestic legislation and international obligations.

Commodity Definition

The commodities are:

- Hatching eggs of chickens (*Gallus gallus*), ducks (*Anas platyrhynchos domesticus* and *Cairina moschata*) and turkeys (*Meleagris gallopavo*), sourced from poultry breeding flocks compliant with the standards described in Chapter 6.4 of the World Organisation for Animal Heath (OIE) *Terrestrial Animal Health Code 2011* (the *Code*) or equivalent; and
- SPF eggs of chickens (*Gallus gallus*) produced by flocks free of specific pathogens. The flocks supplying SPF eggs must be kept under secure biosecurity controls at least equivalent to those required for breeders in the *Code* Chapter on *Biosecurity in Poultry*.

The eggs will be clean when collected, unwashed and have intact (uncracked) shells. They will be collected separately from dirty and broken or cracked eggs. Hatching eggs should be cleaned and sanitised as soon as possible after collection using an approved sanitising agent, in accordance with the manufacturer's instructions.

Recommendations for Identified Risk Organisms

(The requirements for risk organisms are located in Part 2 of the IHS)

The biosecurity risks associated with the importation of poultry hatching eggs have been examined in the documents IRA 2009, IRA 2012 and the RRA 2014.

Risk management measures were justified for the following four risk organisms associated with imported chicken hatching eggs:

- Avian influenza viruses
- Type 1 avian paramyxoviruses
- *Salmonellae*

Risk management measures were justified for the following four risk organisms associated with duck hatching eggs (in addition to those identified for chicken hatching eggs):

- Duck virus enteritis
- Goose and Muscovy duck parvoviruses (Muscovy ducks and their hybrid breeds only)
- Reoviruses of Muscovy ducks (Muscovy ducks and their hybrid breeds only)
- *Chlamydia psittaci*

Risk management measures were carried over from the previous IHSs for the following risk organisms from imported turkey hatching eggs:

- Avian influenza viruses
- Type 1 avian paramyxoviruses
- *Salmonella* Gallinarum-Pullorum
- *Mycoplasma iowae*
- *Mycoplasma meleagridis*
- Turkey rhinotracheitis virus (TRTV)
- Lymphoproliferative disease of turkeys

(Note: the removal of measures for TRT and lymphoproliferative disease are explored in this document)
Additionally risk management measures are proposed for the following risk organisms from turkey hatching eggs:

- *Salmonella arizonae*
- *Salmonella* Enteritidis and *Salmonella* Typhimurium

The IHS requires all diagnostic tests to be approved by MPI and listed in the document, *Approved Diagnostic Tests, Vaccines, Treatments and Post-Arrival Testing Laboratories Testing for Animal Import Health Standards (MPI-STD-TVTL)*. This is because MPI understands that the OIE *Manual* will be moving away from prescribing diagnostic testing in the future. MPI approved diagnostic tests must be either described in the OIE *Manual* or will only be approved after consultation with MPI Investigation and Diagnostic Centre (IDC) laboratory experts. Tests must be considered by IDC as valid for diagnostic purposes in the appropriate class of poultry and must be appropriate for surveillance for the identified risk organism.

In some instances the IHS requires flock testing to demonstrate freedom from disease. The IHS makes reference to testing a randomly selected, statistically valid sample to demonstrate flock freedom from disease. A specific sample size is not specified as this will depend on the sensitivity and specificity of the tests used and the expected prevalence of disease in the flock. This information should be provided when the tests are considered for approval by MPI. The IHS requires a sample size to be sufficiently large to give 95% confidence of detecting

infection where there is at least a 5% prevalence in the flock, unless otherwise stated. Where a test's sensitivity is 99%, 60 samples will be sufficient to provide 95% confidence of detecting infection where there is a prevalence of at least 5% in a population of 500 or more.

It should be noted that for each risk organism, risk management requirements are specified in the IHS as one or more of the following:

- Country, zone or compartment freedom and residency requirements;
- Flock freedom and residency requirements;
- Specified measures to verify individual flock/batch freedom;
- Pre-export isolation (PEI) and post-arrival quarantine (PAQ).

Recommendation

Diagnostic testing and vaccination:

(1) Where diagnostic testing is required it must be conducted at a laboratory approved by the Competent Authority of the exporting country to conduct the required pre-export and/or surveillance testing.

(2) Where flock testing options are used to satisfy specified requirements for identified risk organisms (Part 2), sampling of birds for diagnostic testing must be randomised, and representative of the flock from which the product is derived and samples must be collected under the supervision of the Official Veterinarian. The sample size selected must be sufficiently large to give 95% confidence of detecting infection where there is at least 5% prevalence in the flock, unless otherwise stated.

(3) Laboratory samples from birds must be collected, processed, and stored in accordance with the recommendations in the *Code* and/or *Manual*, and/or approved by MPI.

(4) Diagnostic test(s) and vaccines used must be approved by MPI and listed in MPI-STD-TVTL.

Avian influenza viruses

Analysis

The *Code* terminology for avian influenza was changed in the 2013 version of the *Code*. This resulted in the term "notifiable avian influenza" being replaced with "avian influenza". Low pathogenicity influenzas that were not previously classified as notifiable, are now referred to as influenza A viruses. Accordingly the IHS was amended in September 2014 to refer to avian influenza, instead of notifiable avian influenza.

Exposure to avian influenza (AI) refers to infection of poultry with any influenza A virus of H5 and H7 subtypes or any avian influenza virus with pathogenicity above limits set in Chapter 10.4 (Infection with viruses of notifiable avian influenza) of the *Code*.

AI has not been detected through serological screening in New Zealand caged/barn layers, broilers or pullet-rearer farms. There has been detection of antibodies to H5 viruses on three free range layer farms but no evidence of ongoing virus circulation. Influenza A viruses and some low pathogenicity viruses that would be considered avian influenza virus in poultry have been isolated from wild New Zealand waterfowl.

The definition of AI in the *Code* is limited to infection in poultry. As there is no evidence of highly pathogenic avian influenza in birds in New Zealand or AI circulating in New Zealand poultry measures for all AI can be justified.

AI was not specifically examined in the duck hatching egg IRA as it is deemed appropriate to apply the same measures recommended for chicken hatching eggs. The pre-export recommendations are consistent with the *Code,* with the addition of post-arrival quarantine and testing.

The measures in the previous IHSs for chicken hatching eggs included sanitising eggs, serological sampling of parent birds, parent flocks being resident in the country of export for at least 60 days and being at least 25 km from any premise where AI has been reported within the last 6 months. Birds must not have been vaccinated.

The *Code* recommendations were adopted in 2013 where possible. An alternative flock testing option, included in the IHS as an amendment in September 2014, was added due to prescriptive requirements in the *Code* for surveillance for avian influenza being difficult to meet, particularly for ducks. The amendment to include a flock testing option is based on one of the recommendations in the IRA 2009, and is considered to manage the risk effectively in this commodity. The previous IHSs for hatching eggs also had a flock testing option for avian influenza.

The recommended amendment is for an outcome based clause to be included that will not prescribe the tests to be used or the flock sample sizes required to demonstrate freedom. These will be considered during the country approval process, in accordance with the recommendations in the *Code* chapter 10.4.29 *Surveillance Strategies*, with recommended tests being included *MPI-STD-TVTL*.

Reflecting consideration of the potential impact of AI on the domestic poultry industry, particularly the export trade in hatching eggs and day-old chicks, retention of post-arrival quarantine of imported poultry hatching eggs has been required to meet New Zealand's appropriate level of protection against this avian disease.

Virus isolation or direct ribonucleic acid (RNA) detection such as reverse transcriptase polymerase chain reaction (RT-PCR) allows earlier testing of birds in post-arrival quarantine, without maternal antibody interference (as is seen with serological testing). Virus isolation or RNA detection methods could be used on representative samples of hatch debris, culled and dead-in-shell chicks with release of hatched chicks on receipt of negative results. Virus isolation or RNA detection methods for sampling live birds involves taking swabs rather than blood sampling, so sampling is easier in younger birds and less invasive. Twenty-one days would be sufficient time to allow the virus to have disseminated amongst chicks and clinical signs to develop. The *Code* lists the incubation period to be 21 days, although the onset of disease is usually sooner. Chicks could be tested at 21 days and then released on receipt of negative test results. If serological methods are used, maternal antibodies can be detected for up to four weeks so testing could not take place until after this time. Serological testing could be undertaken after 4 weeks of age, with release on receipt of negative results.

The *Manual* lists virus isolation as the prescribed test for international trade, however for surveillance purposes (unless birds are vaccinated) serology (listed in the *Manual* as an alternative test) is more likely to be used and is a more practical and less expensive option. For post-arrival quarantine, the testing options could include an MPI approved RT-PCR, which will allow earlier testing of birds post hatch. PCR is not an OIE prescribed or alternative test, but is widely used for AI testing and is a faster and less expensive option than viral culture and isolation. Pooled samples for PCR can be used to reduce the number of tests required.

Recommendation

Avian influenza (AI) [all poultry]

(1) The eggs for export must be derived from parent flocks:

a) With a vaccination status of:

i) Not vaccinated for avian influenza; or

ii) Vaccinated for avian influenza in accordance with the provisions of the *Manual* and the nature of the vaccine used and the date of vaccination have been attached to the certificate; and either b) or c) must apply.

b) That have been resident for at least the 21 days before, and during, egg collection in a country, zone or compartment that was free from AI, with current *Code* surveillance requirements being met for avian influenza; or

c) Demonstrated to be free from infection with AI by carrying out testing on a statistically valid sample, selected in accordance with the *Code's* Surveillance Strategies, with a test for AI listed in MPI-STD-TVTL, within the 21 days prior to commencement of egg collection and at a maximum of 21 day intervals during the egg collection period.

Avian paramyxovirus 1 (APVM-1/Newcastle disease)

Analysis

APMV-1 is classified in the IRA 2009 as a risk in chicken hatching eggs and risk management measures are justified. The IRA for duck hatching eggs did not specifically examine Newcastle disease (ND) as it is assumed that risk mitigation measures proposed for chicken eggs would also be appropriate. However, it should be noted waterfowl are highly resistant to clinical manifestations of Newcastle disease. Ducks may shed APVM-1 for months after exposure and may not have a detectable antibody titre. The use of virus isolation or direct RNA detection methods (e.g. RT-PCR), rather than serology, is therefore the preferred test method for ducks.[1]

The current measures for hatching eggs from chickens include sanitising eggs, serological sampling of parent birds, parent flocks being resident in the country of export for at least 60 days and being at least 25 km from any premise where ND has been reported within the last 6 months. Birds must not have been vaccinated with a live vaccine during the 3 months prior to egg collection.

The *Code* recommendations should be adopted where possible. An alternative flock testing option has been included in the IHS in September 2014. This amendment has been made due to the requirements in the *Code* for surveillance for ND being difficult to meet, particularly for ducks or when vaccination is carried out. The amendment to include a flock testing option is based on one of the recommendations in the IRA 2009, and is considered to manage the risk effectively in this commodity. The previous IHSs for hatching eggs also had a flock testing option for ND.

The recommendation is for an outcome based clause to be included that will not prescribe the tests to be used or the flock sample sizes required to demonstrate freedom. These will be considered during the country approval process, in accordance with the recommendations in the *Code* chapter 10.9.29 *Surveillance Strategies*, with recommended tests being included in *MPI-STD-TVTL*.

MPI also received a request to amend the vaccination requirements to include the option of both inactivated and live vaccines to have been used. This is considered acceptable, so the clause contains the additional option.

Live vaccines used must be lentogenic and have an intracerebral pathogenicity index (ICPI) of <0.7, which is below the *Code* definition of ND. In order to account for interassay and interlaboratory variability, a safety margin should be allowed so that vaccine master seed virus strains should not have an ICPI exceeding 0.4. This is discussed in the *Manual*.

Cleavage site sequencing alone cannot be used to specify the characteristics of allowable vaccines. Demonstration of multiple basic amino acids at the F0 cleavage site confirms the presence of virulent or potentially virulent virus however the OIE (Article 10.9.1 of the *Code*) notes that failure to detect multiple basic amino acids at the F0 cleavage site does not confirm the absence of virulent virus. Failure to demonstrate the characteristic pattern of amino acid residues still requires characterisation of the isolated virus by an ICPI test.

Reflecting consideration of the potential impact of ND on the domestic poultry industry, particularly the export trade in hatching eggs and day-old chicks, it was decided that retention of post-arrival quarantine of imported poultry hatching eggs was desirable.

The use of virus isolation or direct RNA detection methods (e.g. RT-PCR) allows earlier testing, either on hatch debris or live chicks without risk of maternal antibody interference (as is seen with serological testing). The *Code* lists the incubation period to be 21 days although the onset of disease is usually sooner. 21 days from hatch is considered sufficient time to allow any potential dissemination of ND amongst hatchlings and for clinical signs to develop. Post-hatch debris could be tested by virus isolation or direct RNA detection methods immediately after the chicks have hatched or live birds could be sampled at 21 days post-hatch and released when negative results are received.

[1] N. H. Christensen, Review of Risk Analysis: Hatching eggs of domestic ducks

Alternatively birds can be sampled by serology after maternal antibodies have waned at around 4 weeks of age, with release on receipt of negative results. The timing of this testing if further discussed later under post-arrival quarantine, due to some detection of low levels of maternal antibodies when testing was carried out at 28 days.

Recommendation

Avian paramyxoviruses type 1 (APMV-1), Newcastle disease (ND) [all poultry]

(1) The eggs for export must be derived from parent flocks:

a) With a vaccination status of either:

i) Not vaccinated for APMV-1; or
ii) Vaccinated for APMV-1 using an inactivated vaccine; and/or
iii) Vaccinated with a live, lentogenic, APMV-1 vaccine strain, in accordance with the provisions of the *Manual*, and the nature of the vaccine used and the date of vaccination have been attached to the veterinary certificate. The master seed virus for the vaccine used must have an intracerebral pathogenicity index (ICPI) <0.4; and either b) or c) must apply.

b) The eggs must be derived from parent flocks that have been resident for at least the 21 days before, and during, egg collection in a country, zone or compartment that was free from Newcastle disease (as defined in the *Code*) with current ND *Code* surveillance requirements being met; or

c) The eggs must be derived from parent flocks demonstrated to be free from infection with APMV-1 by carrying out testing on a statistically valid sample, selected in accordance with the *Code's* Surveillance Strategies, with a test listed in MPI-STD-TVTL, within the 21 days prior to commencement of egg collection and at a maximum of 21 day intervals during the egg collection period.

Salmonella

Analysis

Risk management measures for *Salmonella enterica* subsp. *enterica* serovar Gallinarum-Pullorum in chicken hatching eggs are justified in the IRA 2009. It is deemed appropriate to apply the same risk management measures for the importation of duck hatching eggs.

Paratyphoid infections of poultry are not OIE listed diseases; however the *Code* contains sections on the prevention, detection, and control of *Salmonella* in poultry (Chapter 6.5). Chapter 6.5.9 has recommendations for importation of hatching eggs, with requirements that parent flocks participate in a *Salmonella* surveillance programme in accordance with the *Code*, and have no evidence of *S*. Enteritidis or *S*. Typhimurium.

The IRA 2009 justifies risk management measures for *Salmonella* Typhimurium DT 104 and *Salmonella* Enteritidis phage type 4. More recent analysis (IRA 2010) concluded that paratyphoid *Salmonellae* should not be identified as a potential hazard in imported poultry meat as exotic serotypes associated with poultry overseas are likely to be no more pathogenic than serotypes recognised to be present in New Zealand. However hatching eggs provide a direct pathway for risk organisms to the New Zealand poultry sector, which is recognised free of *S.* Enteritidis. Risk management measures are justified for egg transmitted *Salmonella* serotypes. The IHS will adopt the international standard, as set out in the OIE *Code*.

Although *S. arizonae* is not assessed to be a risk in chicken hatching eggs, the IRA 2010 describes evidence that this organism is recognised to be vertically transmitted in turkey eggs so should be considered a risk in hatching eggs of this species.

The current IHSs for hatching eggs from chickens have the following requirements:

- All flocks from which eggs were obtained are certified free of *Salmonella* Pullorum.

- Non-specific measures included the requirement that during the 28 days prior to collection of eggs, the birds in the flock of origin were inspected and found to be free from clinical evidence of infectious diseases including, amongst others, fowl plague (highly pathogenic avian influenza) and salmonellosis; and that none of these diseases had existed in the flock of origin during the previous 6 months.

The IRA 2009 recommends:

- Testing birds in the parent flock to ensure that they do not carry infection and importing eggs only from flocks recognised as free of infection.

Importing from flocks monitoring for *Salmonella* as per Chapter 6.5 of the *Code*, with an assurance this testing has not identified *S.* Gallinarum-Pullorum*, S.* Typhimurium DT 104 and *S.* Enteritidis*.*

For *S. Arizonae* instead of specifying the sample size and type of testing required where the option of flock testing to demonstrate freedom is selected, it is proposed to amend the wording to require a statistically valid, randomly selected sample to be tested with a test listed in MPI-STD-TVTL. This means alternative testing options can be considered, and the sample size will need to be supported to demonstrate a 95% of detecting infection where there is a 5% prevalence of in the flock.

Recommendation

(1) The eggs for export must be derived from parent flocks in a country, zone or compartment free from *Salmonella* Gallinarum-Pullorum, *Salmonella* Enteritidis and *Salmonella* Typhimurium as demonstrated by surveillance, conducted in accordance with the *Code* requirements for monitoring poultry breeding flocks for *Salmonella*, and approved by an MPI CTO; or

(2) The eggs for export must be derived from a parent flock certified as free from *Salmonella* Gallinarum-Pullorum, *Salmonella* Enteritidis and *Salmonella* Typhimurium. Flock monitoring must have been carried out in accordance with the *Code* requirements for monitoring poultry breeding flocks for *Salmonella*.

Salmonella arizonae [turkeys only]

(1) The turkey hatching eggs must be:

a) Derived from parent flocks in a country, zone or compartment free from *Salmonella arizonae* as demonstrated by surveillance, conducted in accordance with the *Code* requirements for monitoring poultry breeding flocks for *Salmonella*, and approved by an MPI CTO; or

b) Derived from a parent flock certified free from *Salmonella arizonae*. Flock monitoring must have been carried out in accordance with the *Code* requirements for monitoring poultry breeding flocks for *Salmonella*; or

c) Derived from parent flocks demonstrated to be free from *Salmonella arizonae* by testing a statistically valid, randomly selected sample of turkeys within the 7 day period prior to commencement of egg collection with an approved diagnostic test listed in the MPI document MPI-STD-TVTL.

Ornithobacterium rhinotracheale

Analysis

In 2015 MPIs IDC isolated *Ornithobacterium rhinotracheale* (ORT) with a new RT-PCR test. Testing of further samples dating back as far as 2011 indicate that ORT is widespread in New Zealand with isolates identified from both commercial and backyard flocks and both the North and South Island. These findings indicate that ORT can be considered endemic and the measures for ORT in the IHS should be removed.

Recommendation (Amended June 2015)

No measures are recommended for ORT.

Hepesvirus (big liver & spleen disease)

Analysis

There were measures in the previous IHS for chicken hatching eggs from Australia and the United Kingdom for big liver and spleen disease. This was testing 240 birds in the parent flock by agar immunodiffusion test within 30 days of egg collection.

The IRA 2009 lists the hepesvirus causing big liver and spleen disease in the hazard list as not infecting eggs. It is concluded the organism is not vertically transmitted so no measures are justified in the updated IHS.

Recommendation

No risk mitigation measures are justified.

Turkey Specific Diseases

Mycoplasma

Analysis

There were measures in the previous IHS for chicken hatching eggs for *Mycoplasma gallisepticum* and *M. synoviae*. As these organisms have been described in New Zealand the measures for chickens were not included in the 2013 IHS, however the measures in place for turkey hatching eggs were carried over as there was not a new risk assessment available at that time.

The IRA 2009 states *Mycoplasma iowae* is a hazard in chicken hatching eggs from countries other than Australia, however no measures are recommended as the requirement for chickens to come from flocks managed as per Chapter 6.4, biosecurity procedures in poultry production, in the *Code* would make the entry assessment negligible.

In September 2014, following a number of requests from trading partners the prescriptive recommendation for *Mycoplasma* in turkeys were replaced with an outcome based requirement. The RRA 2014 was undertaken to examine the risk of *Mycoplasma* in turkey hatching eggs.

The RRA 2014 concluded that *Mycoplasma iowae* is a risk in the commodity and the following risk management options were presented that were considered to effectively manage the risk:

> ***Option 1:*** *Hatching eggs could be imported from flocks in countries, zones, or compartments free from M. iowae.*
> ***Option 2:*** *Hatching eggs could be imported from turkey flocks that have been shown to be free from M. iowae by culture of cloacal swabs. The current requirement that 10% of the birds in the supply flock have been subjected with negative results in each case to cloacal swab culture for M. iowae could be maintained.*
> ***Option 3:*** *Hatching eggs could be hatched under secure quarantine conditions in New Zealand and material from embryos, dead-in-shell chicks, or hatchlings could be tested for M. iowae by culture or PCR.*
> ***Option 4:*** *Hatching eggs could be subject to antibiotic treatment with enrofloxacin*.

Additionally the RRA 2014 concluded that *Mycoplasma meleagridis* is a risk in the commodity and the following risk management options were presented that were considered to effectively manage the risk:

> ***Option 1:*** *Hatching eggs could be imported from flocks in countries, zones, or compartments free from M. meleagridis.*
>
> ***Option 2:*** *Hatching eggs could be imported from flocks able to demonstrate freedom from M. meleagridis. Based on the United States National Poultry Improvement Plan, initially 100 birds from each breeder flock should be serologically tested and shown to be negative for antibodies to M. meleagridis at more than 12 weeks of age. Subsequently a minimum of 60 samples from the flock should be retested (and shown to be seronegative) at 28-30 weeks of age and at 4-6 week intervals thereafter.*
>
> ***Option 3:*** *Hatching eggs could be hatched under secure quarantine conditions in New Zealand and material from embryos, dead-in-shell chicks, or hatchlings could be tested for M. melegridis by culture or PCR.*
>
> ***Option 4:*** *Hatching eggs could be treated with antibiotics, based on recent antimicrobial sensitivity data.*

Considering the RRA 2014 risk mitigation measures for *Mycoplasma spp.* in turkeys were changed to outcome based in September 2014. The requirement in the IHS released in 2013 for *M. meleagridis* to test 100% of the supply flock with specified tests was replaced with an option to test a statistically valid sample of the flock with an MPI approved test within 28 days of collection of the eggs for export. This is in line with the recommendation in Option 2 of the RRA 2014 above, given that in the US scheme mentioned above the flocks tested every 4-6 weeks retain their negative status.

Recommendation

For *Mycoplasma iowae:*

(1) The eggs for export must be derived from parent flocks in a country where *Mycoplasma iowae* is not recognised to be present; or

(2) Ten percent (10%) of the birds in the parent flock must be subjected, with negative results* in each case, to cloacal swab culture for *Mycoplasma iowae* within the 28 days prior to commencement of collection of eggs for export and the flock must have a negative test history; or

(3) The turkey hatching eggs must be derived from a parent flock demonstrated to be free from *Mycoplasma iowae* by testing a statistically valid sample of the flock with a test listed in MPI-STD-TVTL within the 28 days prior to commencement of collection of eggs for export.

For *Mycoplasma meleagridis*:

(1) The eggs for export must be derived from parent flocks in a country where *Mycoplasma meleagridis* is not recognised to be present; or

(2) The turkey hatching eggs must be derived from a parent flock demonstrated to be free from *Mycoplasma meleagridis* by testing a statistically valid sample of the flock with a test listed in MPI-STD-TVTL within the 28 days prior to commencement of collection of eggs for export; or

(3) The turkey hatching eggs must be derived from a parent flock demonstrated to be free from *Mycoplasma meleagridis* with testing undertaken in accordance with a Competent Authority supervised poultry health scheme with consistently negative results for the past 12 months. Testing must be carried out on a statistically valid sample of the flock, with a test listed in MPI-STD-TVTL.

*In the case of positive or inconclusive results, a further sample must be taken and retested by a test listed in MPI-STD-TVTL at a Competent Authority approved laboratory. Any bird positive to this test must be subject to post mortem and bacteriological examination and show no evidence of *Mycoplasma* infection.

Turkey rhinotrachietis virus (TRTV)

Analysis

There were measures in previous IHSs for turkey hatching eggs for TRTV. From the United Kingdom, birds must either come from vaccinated parent flocks, or the parent flock must test negative for TRTV within 30 days of egg collection to confirm with 99% confidence of detecting a prevalence of 5% that the flock is sero-negative. From other countries the requirement is 10% of the parent flock must be tested as sero-negative. Additionally any respiratory disease in hatchlings during the post-arrival quarantine period must be tested for TRTV. The certification requires no clinical signs of TRTV, including drop in egg production in the parent flock.

The IRA 2004 acknowledges the likelihood of TRTV being present in turkey hatching eggs to be very low, particularly from vaccinated birds. The measures in the previous IHSs required the parent flock to show no clinical signs of TRT in the immediate period prior to, or during egg collection. In case of any outbreak of respiratory disease in quarantine, affected birds must be tested for TRTV isolation using tracheal organ culture and/or PCR.

The IRA 2009 concludes the risk estimate is negligible for pneumoviruses and no risk management measures are necessary in the commodity chicken hatching eggs. The discussion also examines turkey hatching eggs; with the conclusion drawn that there is no conclusive evidence for vertical transmission. The risk estimate was concluded to be negligible.

Recommendation

No specific risk management measures are required for poultry hatching eggs as there is no conclusive evidence that TRTV is vertically transmitted. The parent poultry flock must be healthy as described in the commodity definition.

Lymphoproliferative disease

Analysis

There were measures in previous IHSs for lymphoproliferative disease of turkeys. The measures were limited to an owner's declaration that there has been no evidence of this disease during the rearing period. Lymphoproliferative disease is a rare neoplastic syndrome of turkeys reported in Israel and Europe.

Recommendation

Given the very rare reports of this disease, the high health status required of parent flocks and the non-specific nature of the previous measure, no risk mitigation measures are required.

Duck Specific Diseases

Duck virus enteritis (DVE)

Analysis

DVE has not been reported in New Zealand. Vertical transmission of DVE has been recognised, although more recent reports suggest DVE virus may be excreted only on the surface of the egg from infected carriers. Risk management measures are justified.

The risk management options presented in the IRA 2012 includes:

(1) Importing eggs from flocks in countries where DVE has not been recognised without restriction.

(2) Vaccination against DVE could be prohibited in flocks supplying eggs for export.

(3) Eggs derived from flocks where virus isolation or PCR has demonstrated freedom from DVE could be considered eligible for import.

(4) Imported eggs could be hatched under secure post-arrival quarantine conditions in New Zealand and material from embryos, dead-in shell chicks, or hatchlings could be tested for DVE by virus isolation or PCR.

Diagnosis of DVE is based on a combination of clinical signs, gross pathology, and histopathology together with identification of the agent either by virus isolation or by PCR. Immunological tests have limited value, although detection of neutralizing antibodies to DVE virus is possible. A number of diagnostic tests have been described to detect sero-conversion.

The wording of the flock testing option (IHS option (1)(a)(b)) was been amended in September 2014 to provide additional guidance on the number of samples required for testing and the timing of testing prior to export of eggs. In order to be consistent with the testing requirements throughout this IHS the recommendation is for testing to be undertaken within the 21 days prior to collection of eggs, rather than 28 days as previously listed.

Recommendation (Amended September 2014)

(1) The duck hatching eggs for export must be derived from a parent flock not vaccinated for DVE; and either

a) The duck hatching eggs must be derived from a parent flock in a country where DVE is not recognised; or
b) The duck hatching eggs must be derived from parent flocks demonstrated free from DVE by testing a statistically valid sample of the flock with a test for DVE listed in MPI-STD-TVTL within the 21 days prior to the commencement of collection of eggs for export.

Duck virus hepatitis

Analysis

Duck virus hepatitis (DVH) has not been reported in New Zealand. Vertical transmission of DVH has not been recognised. Eggs will be disinfected and sourced from flocks kept in accordance with the standards described in Article 6.4, biosecurity procedures in poultry production, of the *Code*. Surface contamination or contamination of the egg containers will be avoided by following the measures described in the *Code*.

The IRA 2012 concludes that DVH is not a hazard in the commodity.

The *Code* has the following recommended measures for DVH. Hatching eggs for export:

- Have been disinfected in conformity with the standards referred to in Chapter 6.4, biosecurity procedures in poultry production;
- Come from establishments and/or hatcheries which are recognised as being free from DVH and from hatcheries which comply with the standards referred to in Chapter 6.4, biosecurity procedures in poultry production;
- Were shipped in clean and unused packages.

Recommendation

DVH is not assessed as a risk in the commodity. Sufficient risk mitigation is provided by the requirement to comply with Chapter 6.4 of the *Code*, biosecurity in poultry production.

Goose parvovirus and Muscovy duck parvovirus

Analysis

Goose parvovirus (GPV) and Muscovy duck parvovirus (MDPV or Derzsy's disease) has not been reported in New Zealand. The disease only affects geese and Muscovy ducks (including some hybrids). The disease is known to be vertically transmitted. Risk management measures are justified.

Options presented in the IRA 2012 are:

(1) Eggs from duck species that are neither Muscovy nor their hybrids could be imported without sanitary measures.

(2) Muscovy duck eggs could be imported without restrictions from countries known to be free from GPV or MDPV.

(3) Eggs could be imported from duck flocks that are maintained as closed flocks and in which the disease has not occurred for several years (3-5 years is suggested).

(4) Donor ducks could be kept separate from other ducks for at least 3 weeks, while eggs are being collected and the donors could be tested serologically before going into isolation and again 3 weeks after the end of the isolation period, with negative results.

(5) Imported eggs could be hatched in isolation in New Zealand and the hatchlings mixed with sentinel sero-negative New Zealand Muscovy ducklings. A representative sample of imported and sentinel birds could be tested serologically with negative results at the end of the quarantine period of at least 3 weeks.

Option 3 describes the establishment of a compartment for disease freedom. This would require the exporting country's veterinary authority and MPI to approve a biosecurity plan.

Option 4 would require certification that the pre-export isolation facility had an appropriate biosecurity plan in place and that the facilities were acceptable for isolation. Additionally the consignment would be delayed, or would likely have been imported and incubating while results of the second testing were collected.

The wording of the flock testing option (IHS option 3) was amended in September 2014, to provide additional guidance on the number of samples required for testing and the timing of testing prior to export of eggs.

Recommendation

(1) The duck hatching eggs must be from breeds other than Muscovy duck (*Cairina moshata*) and their hybrids; or

(2) The Muscovy duck hatching eggs (or hybrid Muscovy duck hatching eggs) must be derived from a parent flock in a country where Muscovy duck parvovirus and goose parvovirus is not recognised; or

(3) The Muscovy duck hatching eggs (or hybrid Muscovy duck hatching eggs) must be derived from an establishment that has maintained a closed flock with a negative surveillance history for goose parvovirus and Muscovy duck parvovirus for the past 3 years. The parent flock must be demonstrated free from goose parvovirus and Muscovy duck parvovirus by testing a statistically valid sample of the flock with a test for goose parvovirus and Muscovy duck parvovirus listed in MPI-STD-TVTL within the 21 days prior to the commencement of collection of eggs for export.

Reoviruses of Muscovy ducks (DRV)

Analysis

Duck reovirus of Muscovy ducks (DRV) has been recognised in South Africa, France, Israel, and China. It has not been recognised in New Zealand and is considered to be a risk in imported hatching eggs from Muscovy ducks or their hybrids.

Options presented in the IRA are:

(1) Eggs from duck species that are neither Muscovy nor their hybrids could be imported without sanitary measures.

(2) Muscovy duck eggs could be imported without restrictions from countries known to be free from DRV.

(3) Eggs could be imported from duck parent flocks that are maintained as closed flocks and in which the disease has not occurred for several years (3-5 years is suggested).

(4) Donor ducks could be kept isolated from other ducks for at least 3 weeks, while eggs are being collected and the donors could be tested serologically before going into isolation and again 3 weeks after the end of the isolation period, with negative results.

(5) Imported eggs could be hatched in isolation in New Zealand and the hatchlings mixed with sentinel sero-negative New Zealand Muscovy ducklings. A representative sample of imported and sentinel birds could be tested serologically with negative results at the end of the quarantine period of at least 3 weeks.

Option 3 describes the establishment of a compartment for disease freedom. This would require the exporting country's veterinary authority and MPI to approve a biosecurity plan.

Option 4 would require certification that the facility and procedures had an appropriate biosecurity plan in place and that the facilities were acceptable for isolation. Additionally the consignment would be delayed, or would likely have been imported and incubating while results of the second testing were collected.

Risk management measures should only apply to Muscovy ducks and their hybrids. Muscovy duck eggs could be imported without restriction from countries free of DRV.

In order to manage the risk prior to importation, where the country of origin cannot be deemed as free of DRV, imported hatching eggs of Muscovy ducks (and their hybrids) may be imported from closed parent flocks with a negative surveillance history for the past 3 years and which were tested negative within the 28 days prior to commencement of collecting eggs for export.

The wording of option 3 in the IHS has been amended to provide additional guidance on the number of samples required for testing and the timing of testing prior to export of eggs.

Recommendation

(1) The duck hatching eggs must be from breeds other than Muscovy duck (*Cairina moshata*) and their hybrids; or

(2) The Muscovy duck hatching eggs (or hybrid Muscovy duck hatching eggs) must be derived from a parent flock in a country where duck reovirus (DRV) has not been recognised; or

(3) The Muscovy duck hatching eggs (or hybrid Muscovy duck hatching eggs) must be imported from an establishment that has maintained a closed flock with a negative surveillance history for reovirus of Muscovy ducks for the past 3 years. The parent flock must be demonstrated free from reovirus of Muscovy ducks by testing a statistically valid sample of the flock with a test for DRV listed in MPI-STD-TVTL within the 21 days prior to the commencement of collection of eggs for export.

Chlamydia psittaci

Analysis

The available evidence indicates that serovars C and E of are not present in New Zealand and are assessed to be a risk in duck hatching eggs. There are no measures in the *Code* for chlamydiosis in poultry.

Options presented in the IRA 2012 are:

(1) Duck eggs could be imported without restrictions from countries where chlamydiosis has not been reported in commercial ducks.

(2) Eggs could be imported from flocks that are maintained as closed flocks and in which ongoing surveillance has demonstrated freedom from *C. psittaci*.

(3) Donor ducks could be kept isolated from other ducks for at least three weeks before eggs are collected, and the donors tested serologically for exposure to *C. psittaci* before going into isolation and again three weeks after the end of the collection period, with negative results.

(4) Imported eggs could be hatched in isolation in New Zealand and a representative sample of chicks could be tested serologically with negative results. Any dead hatchlings or dead-in-shell chicks could be examined to detect the presence of *C. psittaci* using histochemical staining of liver and spleen impression smears.

(5) A combination of point 2 and 3 would allow the parent flock to be tested prior to egg collection and the eggs to be tested post-hatch in quarantine in New Zealand, without the complication of requiring some ducks to be isolated, or for testing ducks after egg collection, when the eggs would either be incubating in quarantine, or would be so aged hatchability would be low.

The wording of option 2 of the IHS has been amended to provide additional guidance on the number of samples required for testing and the timing of testing prior to export of eggs.

Recommendation

(1) The duck hatching eggs must be derived from parent flocks in a country where *Chlamydia psittaci* (serovar C and E) in ducks is not recognised; or

(2) The duck hatching eggs must be derived from parent flocks which are kept as closed flocks with a negative surveillance history for *Chlamydia psittaci*. The parent flock must be demonstrated free from *Chlamydia psittaci* by testing a statistically valid sample of the flock with a test for *Chlamydia psittaci* listed in MPI-STD-TVTL within the 21 days prior to the commencement of collection of eggs for export. The sample size must be sufficient to detect 10% prevalence with 99% confidence. Post-arrival quarantine testing is required as per Schedule 3.

Post-Arrival Quarantine Requirements

Analysis

Previous IHSs for hatching eggs require post-arrival quarantine in a facility approved to the *MPI Standard for Avian Transitional Facilities* (154.02.05). The quarantine period is required to mitigate risk of AI and ND incursion from hatching eggs. The air filtration requirement was based on potential for ND to be spread via the airborne route. This includes a requirement for filtration of exhaust air. The current air filtration requirements are consistent with the 2001 IRA, with filtration requirements being classified as semi-HEPA filtration. MPI is not proposing to review the transitional facility standard at this time, although the filtration requirements may be revisited if the standard is to be reviewed. Any changes would take into account the findings of the IRA 2001(and its appendices) and would be consulted on.

SPF eggs must be used within a transitional approved to MPI *Standard for Avian Transitional Facilities (154.02.05)* or MPI *Standard for Transitional Facilities for Biological Products (154.02.17)*. SPF eggs, any egg products and any resultant chicks used in a transitional facility for biological products must be destroyed, triple bagged and incinerated at the conclusion of all work.

In September 2014 the post-arrival quarantine test sample size requirements for AI and ND were amended to match that of the pre-import requirements which is testing a sufficiently large sample to give 95% confidence of detecting infection at 5% prevalence. This replaced the previous recommendation of testing with 99% confidence of detecting infection where there is at least a 5% prevalence, and reduced the sample size required from 90 birds to 58 birds. See the following website to see the calculation used: http://epitools.ausvet.com.au/content.php?page=FreedomSS&Prevalence=0.05&dpaType=0&Sens=0.99&seh=0.95&Population=500

It also became apparent that in some circumstances maternal antibodies may be detected when serological testing is carried out as early as 28 days. Because of the flexibility provided to the facility operators by allowing early testing it was not proposed to change this date, but to allow the date of testing to be optional once 28 days has been reached. If maternal antibodies are suspected, then the birds must be retested at a timing agreed with MPI and the authorised facility supervisor. Timing of retesting takes into account the level of antibody identified, the clinical history of the birds and the vaccination history of the parent flock the eggs were derived from.

Recommendation

Schedule 3 - Post-Arrival Quarantine amendment to reduce the post-arrival testing sample size for AI and ND to match that of the pre-export requirements, requiring a sample size sufficient to detect with 95% confidence a prevalence of 5%. In most circumstances this will require a sample size of at least 60 birds to be selected.

Additional requirements were added in September 2014 in the case maternal antibodies are detected when serological sampling is carried out earlier than 42 days of age. Schedule 3, Newcastle disease (1) c) changes are as follows:

Serological testing of chicks for APMV at or after 28 days of hatching. The sample size must be sufficient to confirm that the flock is free from infection with at least 95% confidence of detecting 5% prevalence. Testing must be conducted after 28 days to avoid interference of maternal antibodies. If maternal antibodies are suspected in samples collected at or after 28 days, the Authorised Supervisor must be notified immediately and repeat testing must be carried out on or before 42 days of age or as agreed with MPI. Rising serum titres or any clinical evidence of disease must be reported immediately in accordance with the requirements in the avian transitional facility standard).