



Risk Management Proposal

ZOOLIZAD.SPE

2017

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1 Purpose

The purpose of this document is to:

- Present risks associated with zoo lizards and zoo lizard hatching eggs.
- Show how options for the management of risk organisms have been assessed.
- Provide recommendations for import requirements.

2 Background

Imports of zoo lizards and zoo lizard hatching eggs are currently allowed under the following import health standards:

- IHS for Zoo Lizards from Australia (ZOO LIZANIC.AUS, dated 22 October 2010)
- IHS for Zoo Lizard Hatching Eggs from Australia (ZOO LIZEGIC.AUS, dated 22 October 2010)

Following the seizure of two New Zealand geckos that were illegally smuggled into Germany, the Department of Conservation (DoC) requested the development of an IHS to allow these lizards to be returned to New Zealand.

In response to the request, MPI developed a rapid risk assessment (RRA) *Smuggled Lizards Returning to New Zealand from Europe*.

3 Options assessment

For a detailed analysis of potential hazards and their risks please refer to the below documents, which contain the relevant risk assessment and management options for each risk organism.

- Import risk analysis (IRA): *Specified Members of the Order: Squamata from Government-Approved Zoological Collections in Australia* (dated October 2008) <https://www.mpi.govt.nz/document-vault/2860>
- Rapid risk assessment (RRA): *Smuggled Lizards Returning to New Zealand from Europe* (dated July 2015). All risk decisions from that document are included in this RMP.

The IRA 2008 concluded that risk mitigation measures were justifiable for the following diseases for lizards from Australia:

- Atadenoviruses
- Exotic *Salmonella* spp.
- Gastrointestinal nematodes
- Haemosporidian protozoa
- Entamoeba invadens
- Ectoparasites

The RRA 2015 identified the following additional risk organisms for lizards from the European Union:

- Iridoviruses
- Edwardsiella tarda.

This RMP also discusses further risk management options for Atadenoviruses, from the RRA.

Risk mitigation measures for gastrointestinal nematodes, ectoparasites, haemosporidian protozoa, and Entamoeba invadens are adequately covered in ZOO LIZANIC.AUS and will therefore remain unchanged in the new IHS.

No measures were considered necessary for *Salmonella* spp. other than the animals being certified as healthy prior to export, due to the small numbers of lizards being imported and the fact that lizards will be kept in containment. This is consistent with other recent live animal IHSs and will remain unchanged in the new IHS.

4 Objective

The objective is to manage, to an acceptable level, the biosecurity risks posed by the importation of lizards and lizard hatching eggs destined for zoo containment in New Zealand.

5 Recommendations for identified risk organisms

The diseases that were considered as potential hazards are those that could be transmitted by lizards and that may infect domestic, feral /wild animals, or humans in New Zealand.

5.1 Atadenoviruses

No members of the Atadenovirus genus are included in the OIE list of notifiable diseases.

5.1.1 Risk management for Atadenoviruses from ZOO LIZANIC.AUS

- (1) Within the last 12 months atadenoviruses were excluded as the cause of illness or death affecting any animals of the genus to be exported on the basis of either specific laboratory diagnostic procedures, clinical or pathological grounds or on the basis of the diagnosis of an alternative cause of disease.

5.1.2 Risk management options presented in the RRA 2015

- (1) All animals of the species to be exported to New Zealand could have been resident in the premises for at least 90 days prior to the commencement of a pre-export quarantine period or since birth/hatching.
- (2) A 6-month quarantine period coupled with attempts to find virus shedding could be used to reduce the likelihood of introducing a subclinically infected reptile to a new group. The animals could be kept in a separate room, with a separate air duct system and separate set of husbandry tools and housed individually. The animals could be tested with the nested-PCR method (Wellehan et al. 2004) before and during the quarantine period. The animals could be tested with the in-house method (Marschang 2015) before and during the quarantine period.
- (3) Imported animals could be kept in containment indefinitely.

5.1.3 Discussion

- (1) Atadenovirus infection is regarded as an emerging threat to the health of captive squamata.
- (2) Atadenoviruses are opportunistic pathogens associated with disease in times of stress, such as when animals are kept in captivity. Although they have been described in lizard species overseas there are no reports of these viruses in New Zealand. While most infections are clinically unapparent, a range of clinical diseases have been associated with these pathogens. Therefore, it was concluded that atadenoviruses are identified as a hazard.

The RRA 2015 options allow for lizards with unknown disease history, as is the case with most New Zealand returned smuggled lizards, to be imported.

5.1.4 Recommendations

One of the following options is required:

- (1) During the 12 months prior to export, atadenoviruses were excluded as the cause of illness or death affecting any reptiles at any zoos in which the lizards resided, on the basis of either specific laboratory diagnostic procedures, clinical or pathological grounds or the diagnosis of an alternative cause of illness or death; or

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- (2) Each lizard was subjected to an additional 6 months pre export isolation (PEI) or post arrival quarantine (PAQ) period and kept in a separate room, with separate air duct system, and separate husbandry tools and housed individually. During this time, using an MPI-approved test, each lizard must be tested twice for atadenoviruses; the first time immediately prior to entry; and the second during the additional 6 months quarantine; or
 - (3) The lizards must be kept isolated from New Zealand native reptiles or zoo reptiles not of equivalent health status and remain separated indefinitely. (This option is only available to NZ native lizards).

5.2 Iridoviruses

Of the five genera of iridoviruses only ranaviruses infect reptiles. Epizootic haematopoietic necrosis virus and red sea bream iridovirus (both included in the ranavirus genus) and ranavirus infection of amphibians are included in the 2018 OIE list of notifiable diseases.

5.2.1 Risk management options presented in the RRA 2015

- (1) The animals could be required to have been continuously resident in the premises for at least 90 days prior to export or since birth.
- (2) No case of disease due to ranaviruses has been diagnosed in reptiles being exported at the premises of origin during 12 months prior export.
- (3) Each animal could be held in isolation from other animals for 90 days prior to the date of export and be required to have remained free from clinical signs of infectious or contagious disease during that period.
- (4) PCR testing of animals could be performed before, during and after quarantine period.

5.2.2 Discussion

- (1) DoC raised the issue that the risk of ranaviruses, which was not addressed in the current IHS for lizards from Australia, becomes a concern if the imported lizards have contact with other zoo animals that are potentially released. An example is the 'breed for release' programme for Tuatara.
- (2) Transmission of infection occurs through co-habitation, feeding and fighting. Thus, the RRA 2015 concluded that the risk of ranaviruses is mitigated if the lizards remain isolated from all other reptiles indefinitely.
- (3) Alternatively, the lizards could be subjected to tests to detect ranaviruses. Previously, these tests required that the lizards be euthanised and were therefore considered unsuitable. Recent developments however enable testing for ranaviruses on live lizards and therefore this was included as an option in the RRA 2015.

5.2.3 Recommendations

One of the following options is required:

- (1) Each lizard originates from a country approved by MPI to be free from ranaviruses in reptiles; or
- (2) During the 12 months prior to export, ranaviruses were excluded as the cause of illness or death affecting any reptiles at any zoo in which the lizards resided on the basis of either specific laboratory diagnostic procedures, clinical or pathological grounds or diagnosis of an alternative cause of illness or death; or
- (3) Using an MPI approved test, each lizard must be tested three times for ranaviruses with negative results:
 - a) The first test must be done 1 month prior to the start of PEI or PAQ.
 - b) The second and third test must be done during PEI or PAQ or;
- (4) The lizards must be kept isolated from New Zealand native reptiles or zoo reptiles not of equivalent health status and remain separated indefinitely. (This option is only available to NZ native lizards).

5.3 *Edwardsiella tarda*

E. tarda is not included on the OIE list of notifiable diseases.

5.3.1 Risk management options presented in the RRA 2015

- (1) Individuals could be required to demonstrate freedom from *E. tarda* based on bacterial culture of faecal/cloacal samples.
- (2) Cloacal samples could be collected and parallel tested with both PCR assay and microbiological culture could be used to further increase the overall sensitivity and specificity of the testing methods.
- (3) Individuals could remain in isolation.

5.3.2 Discussion

Although *E. tarda* may be part of the normal flora of reptiles, it is also an opportunistic pathogen. It is likely that conditions of stress, which lead to immunocompetence could cause clinical disease.

5.3.3 Recommendations

One of the following options is required:

- (1) Each lizard originates from a country approved by MPI to be free from *Edwardsiella tarda* in reptiles; or
- (2) Each lizard is subjected to two faecal samples or cloacal washings cultured for *Edwardsiella tarda* at least 14 days apart with negative results; or
- (3) Cloacal samples of the lizards are tested for *Edwardsiella tarda* using a PCR assay with negative results; or
- (4) The lizards are kept isolated from New Zealand native reptiles or zoo reptiles not of equivalent health status and remain separated indefinitely. (This option is only available to NZ native lizards).

5.4 *Entamoeba invadens*

Entamoeba invadens is not included in the OIE list of notifiable diseases.

5.4.1 Risk management options presented in the RA 2008

- (1) Animals to be imported could come from establishments that have no known history of *E. invadens* infection. The premises of origin could be under veterinary supervision and the health of the animal(s) could be monitored so that incidents of disease and death are identified promptly and *E. invadens* excluded as the cause of gastrointestinal disease in lizards, snakes, or testudines during the preceding 12 months.
- (2) Faecal samples or cloacal washings could be examined for cysts of *E. invadens*.
- (3) Greater confidence that animals to be imported come from collections free of *E. invadens* could be gained through sampling of herbivorous reptile species that may have some degree of contact with the species to be imported. This could include turtles and herbivorous lizards that are cared for by the same staff, have utensils cleaned in shared facilities or are in enclosures with contact through drainage.
- (4) Treatment of infected animals with metronidazole reduces the pathogenic effects of infection in susceptible species but there is no evidence that it eliminates the excretion of cysts.

5.4.2 Risk management for *Entamoeba invadens* from ZOO LIZANIC.AUS

- (1) Animals intended for export must have come from establishments that have no known history of *E. invadens* infection. The health of the animals have been monitored so that incidents of disease and death were identified promptly and *E. invadens* excluded as the cause of gastrointestinal disease in lizards, snakes, or testudines during the preceding 12 months; or

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- (2) Any reptiles in contact with the animals intended for export within the preceding 12 months, have tested negative to *E. invadens* by examination of faecal samples or cloacal washings for *E. invadens* cysts; and
 - (3) It was confirmed that the animal itself is free from *E. invadens* by the repeat examination of faecal samples or cloacal washings on two separate occasions for cysts of *E. invadens* with negative results at least 14 days apart.

Note: reptile species in contact with the animals intended for export includes turtles and lizards that are cared for by the same staff, have utensils cleaned in shared facilities or are in enclosures with contact through drainage.

5.4.3 Discussion

E. invadens is a contagious organism transmitted via the faecal-oral route. *E. invadens* can infect herbivorous lizards as commensals, in which case, spread from healthy animals is likely.

Other *Entamoeba* spp., some of which are present in New Zealand, can infect lizards with no deleterious effects and hence care must be taken in the identification of *E. invadens* cysts when examining faecal or cloacal samples for *Entamoeba* as recommended in the RA 2008.

Due to the low sensitivity of such examinations, diagnosis of *E. invadens* is problematic and repeat examinations may be required.

5.4.4 Recommendations

One of the following options is required:

- (1) Each lizard resided in one or more zoos that have no known history of *Entamoeba invadens* infection. The health of all reptiles at the zoo/s was monitored so that incidents of disease and death were identified promptly and *Entamoeba invadens* was excluded as the cause of gastrointestinal disease in lizards, snakes, or testudines (turtles) during the preceding 12 months; or
- (2) Any reptiles in contact with the animals intended for export within the preceding 12 months, have tested negative to *E. invadens* by examination of faecal samples or cloacal washings for *E. invadens* cysts; and
- (3) During PEI or PAQ each lizard must be subjected to two faecal samples or cloacal washings for cysts of *Entamoeba invadens* at least 14 days apart with negative results. Results must be reported to MPI, and repeat examination of faecal samples or cloacal washings may be required by MPI.

Guidance

- Reptile species in contact with the lizards intended for export include turtles and lizards that are cared for by the same staff, have utensils cleaned in shared facilities or are in enclosures with contact through drainage.