

**REVIEW OF SUBMISSIONS ON:**

**Disease risk assessment: The use in New Zealand of imported semen derived from an Argali (*Ovis ammon polii*) sheep.**

**Biosecurity Authority  
Ministry of Agriculture and Forestry  
Wellington  
New Zealand**



**April 2002**

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April 2002

Approved for general release

Derek Belton  
Director Animal Biosecurity  
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## EXECUTIVE SUMMARY

In November 2001, the Ministry of Agriculture and Forestry (MAF) released an import risk analysis on the use in New Zealand of imported semen derived from an Argali (*Ovis ammon polii*) sheep.

MAF received five submissions on the risk analysis- all from within New Zealand.

The one submission from the Department of Conservation (DoC) and two from the Royal Forest and Bird Protection Society of New Zealand expressed concerns about the introduction of Argali sheep into New Zealand and its potential environmental impact.

Both organisations expressed concern that the environmental effects of this organism will not be assessed and considered before the organism is released into New Zealand, and implied it is the Ministry of Agriculture and Forestry's role to do so.

MAF does not accept it has the responsibility to assess and consider the potential environmental impact of Argali sheep. Argali sheep are new organisms under the Hazardous Substances and New Organisms Act 1996 (HSNO Act). Parliament has, by statute, created the Environmental Risk Management Authority (ERMA) for the purpose of assessing the risk to New Zealand of new organisms. The potential environmental impact of this new species will be considered by ERMA, if the importer applies for the release of Argali sheep from containment. The biosecurity clearance of the Argali sheep progeny will not be given unless MAF's disease sanitary requirements are fulfilled and ERMA approval for release is given.

After considering the submissions from the Northern North Island sheep council and from Dr Kevin Corrin, MAF has made the following changes to the proposed sanitary measures:

- The period of quarantine for the first generation progeny of the scrapie freedom assurance programme period of quarantine will be 5 years.
- All three batches of the Argali ram semen will be cultured for *Mycoplasma*, *Ureaplasma* and *Acholeplasma* species.
- All three batches of the Argali ram semen will be cultured for *Chlamydia psittaci*.

# INTRODUCTION

Argali sheep (*Ovis ammon polii*) semen, blood and tissues were imported in January 2001 under permit into a transitional and containment facility approved by the Ministry of Agriculture and Forestry (MAF). The semen, blood or tissues cannot be given biosecurity clearance until import health standards relating to each are developed under the Biosecurity Act 1993, and until Environmental Risk Management Authority (ERMA) approval is given for release of Argali sheep and crossbred progeny.

This document and the disease risk analysis dated 1 October 2001 is applicable only to the Argali sheep semen. On the basis of this risk analysis, MAF proposes that the semen importation will be required to enter a scrapie freedom assurance programme. Under such a programme the imported semen will not be given biosecurity clearance, but clearance could be given to second generation progeny derived from the semen.

Should biosecurity clearance be sought for other Argali tissues held in containment, a specific disease risk analysis would be required. The blood samples will not be given biosecurity clearance and will be used to fulfil the disease testing requirements.

The completion of the risk analysis on the use in New Zealand of imported semen derived from an Argali sheep was notified in the MAF publication *Biosecurity*, issue 31, dated 1 November 2001.

The risk analysis was conducted by a private consultant working on behalf of the would-be importer. It is not an official MAF Biosecurity Authority risk analysis. Nevertheless, this analysis has been subjected to MAF's internal scientific review process and to external expert review. The risk analyst has addressed all the points raised by the reviewers.

MAF received submissions from the following:

|   |                  |
|---|------------------|
| Royal Forest and Bird Protection Society of New Zealand | 10 October 2001  |
| Royal Forest and Bird Protection Society of New Zealand | 5 December 2001  |
| Department of Conservation <i>Te Papa Atawhai</i>       | 6 December 2001  |
| K. Corrigan, Ministry of Agriculture and Forestry       | 17 December 2001 |
| North Island Sheep Council                              | December 2001    |

This document summarises the issues raised in the submissions, and presents the MAF response to each.

## **DEFINITIONS**

### **Transitional facility**

“Transitional facility” means:

- a) Any place approved as a transitional facility in accordance with section 39 of the Biosecurity Act 1993 for the purpose of inspection, storage, treatment, quarantine, holding, or destruction of uncleared goods; or
- b) A part of a port declared to be a transitional facility in accordance with section 39 of the Biosecurity Act.

For the purposes of this review this means, the transitional facility holding the Argali sheep blood, semen and tissues until the requirements of the import health standard are addressed.

### **Containment facility**

“Containment facility” means a place approved in accordance with section 39 of the Biosecurity Act for holding organisms that should not, whether for the time being or ever, become established in New Zealand.

For the purposes of this review this means, the containment facility holding the Argali sheep blood, semen and tissues until ERMA approval is given for release. The structural and operating requirements for the containment facility holding the Argali sheep semen, blood and tissues are stated in the ‘MAF Reg Standard 154.03.06, Containment Standard for Field Testing of Farm Animals’<sup>1</sup>.

### **Risk goods**

“Risk goods” means any organism, organic material, or other thing or substance, that (by reason of its nature, origin, or other relevant factors) it is reasonable to suspect constitutes, harbours, or contains an organism that may-

- a) Cause unwanted harm to natural and physical resources or human health in New Zealand; or
- b) Interfere with the diagnosis, management, or treatment, in New Zealand, of pests or unwanted organisms.

### **Uncleared goods**

“Uncleared goods” means imported goods for which no biosecurity clearance has been given.

# SUBMISSIONS

## 1. Royal Forest and Bird Protection Society of New Zealand

10 October 2001

Martin Van Ginkel  
MAF Biosecurity Authority  
PO Box 2526  
Wellington



Dear Martin,

**RE: Disease risk assessment for the importation of semen from argali sheep**

Forest and Bird is concerned at the process MAF has adopted regarding the importation of semen from argali sheep into New Zealand. According to the Environmental Risk Management Authority (ERMA) this breed of sheep is new to New Zealand. An application must be approved by ERMA before this new organism can be brought into New Zealand. No such application has been made to ERMA, therefore the preparation of a disease risk assessment was premature, without first obtaining approval to import the sheep.

Under the HSNO Act, ERMA must consider the environmental risk posed by a new organism before deciding whether to allow its importation into New Zealand. Furthermore, if approval is granted, the Biosecurity Act requires that Import Health Standards consider risks to the environment. Not only has a new organism application under the HSNO Act been overlooked, this disease risk assessment has not addressed environmental risks. We therefore strongly disagree with MAF's statement that the assessment is "sufficiently robust for an Import Health Standard to be developed from".

Forest and Bird is not satisfied with the process that has been conducted to date, which has failed to meet the obligations under the HSNO and Biosecurity Acts. When this matter is progressed using the correct process Forest and Bird expects to be consulted. Alternatively, if we do not hear further, we will assume that the application has not proceeded.

Yours sincerely,

Karli Thomas  
Biosecurity Awareness Officer

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- 1.1** “Forest and Bird is concerned at the process MAF has adopted regarding the importation of semen from Argali sheep into New Zealand. “ According to the Environmental Risk Management Authority (ERMA) this breed of sheep is new to New Zealand. An application must be approved by ERMA before this new organism can be brought into New Zealand. No such application has been made to ERMA, therefore the preparation of a disease risk assessment was premature, without first obtaining approval to import the sheep.”

MAF comment:

At the time the application to import Argali sheep was initiated, in 1990, MAF considered import applications under the Animals Act 1967. In making a decision to allow the importation of an animal, the Animals Act directed MAF to consider the possible economic and social effects, and the possible public and animal health effects of the importation. In the case of a new species, the possible effects on natural resources should it become established and the possible disease risks were also considered. Applications to import a species not already present in New Zealand were required by MAF to provide an Importation Impact Assessment (IIA) and to have a Disease Risk Assessment (DRA) carried out. An IIA report for Argali sheep was submitted by the applicant.

However, before the completion of this application the Biosecurity Act 1993 and subsequently the Hazardous Substances and New Organisms Act 1996 (HSNO Act) were enacted.

The Biosecurity Act saved the Animals Act provisions relating to the importation application process, but introduced new biosecurity measures. A permit for importation was required under the Animals Act for new organisms, and the biosecurity issues were dealt with under the Biosecurity Act through the issuing of import health standards.

The Animal Act savings were rescinded by a HSNO Commencement Order in 1998. Argali sheep became new organisms under the HSNO Act, and consideration of the environmental impact of new organisms became the responsibility of the Environmental Risk Management Authority (ERMA).

The transitional provisions of the HSNO Act provided that certain applications for permits under section 13(1) of the Animals Act could be continued and determined as if section 13 had not been repealed. Such a permit would be for importation into containment only. The Argali sheep application met the criteria and a permit for importation into containment was granted. There are no further transitional provisions to allow for the release from containment of the Argali sheep, crossbred progeny or germplasm under the Animals Act.

MAF agrees with the submission that an application must be made to ERMA for approval for release from containment.



## 1.2 Forest and Bird asserts :

“Not only has a new organism application under the HSNO Act been overlooked, this disease risk assessment has not addressed environmental risks.”

“Forest and Bird is not satisfied with process that has been conducted to date, which has failed to meet the obligations under the HSNO and Biosecurity Acts.”

MAF comment:

MAF disagrees that an application under the HSNO Act has been overlooked. As stated previously, this importation will have to be considered under the HSNO Act before the Argali sheep, crossbred progeny or germplasm can be released from containment.

The HSNO Act relates to the protection of the environment, and the health and safety of people and communities, by preventing or managing the adverse effects of hazardous substances and new organisms. Argali sheep are new organisms under the HSNO Act. Parliament has now, by statute, created the Environmental Risk Management Authority for the purpose of assessing the risk to New Zealand of new organisms. It is ERMA's area of responsibility to assess the potential impact of this new species on the environment and to prevent or manage the risks associated with its importation. Argali sheep, crossbred progeny or germplasm will be released from containment only if ERMA approval is given.

The importer has been informed that an application to ERMA for approval to release is required. It is the importer's prerogative when or if this application is made.

Argali sheep semen was imported into containment under the Animals Act 1967 through the transitional provisions of the HSNO Act section 254(8)(a). Although a permit to import under the Biosecurity Act was issued, this permit was only to allow importation of Argali sheep semen, blood and tissues into containment. Argali sheep, crossbred progeny, or germplasm cannot be given biosecurity clearance until a further import health standard is developed under the Biosecurity Act, the requirements of this import health standard fulfilled and ERMA approval is given. The import health standard for semen will require that only the second generation progeny derived from the semen may be released and not the semen itself.

## 2. Royal Forest and Bird Protection Society of New Zealand (Second submission)

### **Forest and Bird submission: *Import risk assessment for argali sheep***

December 2001



#### ***Summary***

Forest and Bird is concerned at the possibility of an import health standard (IHS) being issued for argali sheep. Our concerns include:

- (1) The inadequacy of the risk assessment that has been undertaken, particularly in terms of environmental impacts.
- (2) The potential environmental impacts of any release of argali sheep in New Zealand.
- (3) The potential for intentional release and establishment of argali sheep into the wild to satisfy demand for hunting, and implications for pest control.
- (4) The process that has been followed in assessing the import risks associated with argali sheep.

On the basis of these concerns, Forest and Bird opposes the development of an import health standard for argali sheep. Given the potential environmental impacts we have identified in our research, we will also oppose a new organism application for this species should one be made.

#### ***Inadequacy of risk assessment***

We strongly disagree with MAF's view that the disease risk assessment is robust enough to base an import health standard on. We have also received copies of both the 1991 report on disease risk, and the 1990 environmental impact assessment. We question why MAF has required an updated, independent disease risk assessment, but has not required an updated, independent environmental impact assessment.

There have been fundamental changes to the biosecurity regime since 1990/1991, the most obvious being the introduction of the Biosecurity Act in 1993. The framework for risk assessment has changed, particularly with regard to environmental risks which MAF now has greater responsibility for assessing. The development of import health standards by MAF is now carried out under the Biosecurity Act, and MAF Biosecurity Authority has produced a policy on risk assessment. Both these documents specify that MAF must consider the potential effects on people, the economy and the environment of organisms that may be introduced as a consequence of importing risk goods (section 22 (5) and section 5.6 respectively).

Argali sheep are a risk good (as defined in the Biosecurity Act) in that they constitute a risk, as their release in New Zealand would expose organisms (in particular alpine vegetation and ecosystems) to damage, loss and harm. Furthermore their release could interfere with the management of pests or unwanted organisms in New Zealand, in the same way that the presence of feral deer interferes with the management of a variety of pests. The hunting lobby objects to the control of feral deer, and also to the management of other pests (including bovine tuberculosis and possums) where control methods reduce deer numbers.

Given that argali sheep are a risk good, MAF is therefore required to assess the potential impacts of their importation into New Zealand on the environment. The six-page "synopsis of the environmental impact of proposed argali sheep import to New Zealand" prepared in 1990 is clearly not an adequate assessment of the potential effects of argali sheep on the New Zealand environment.

The synopsis was prepared by the applicant himself (unlike both the 1991 and 2001 disease assessments which were prepared by independent scientists). The references included were from 1938 to 1984, though more recent information is available. The synopsis is not a robust risk assessment, and many of the assertions made are not backed up by any references. Some examples of the statements made in the synopsis include:

*"These sheep are grazers not browsers, their impact on indigenous and modified NZ grasslands would be identical to that of domestic sheep"*

Although argali have a grass-eating type digestive system, references suggest that they are adaptable and will eat grasses, herbs, shrubs, leaves, sedges, sage, lichens, bark, wood, seeds and fruit<sup>1</sup>. Furthermore, argali sheep weigh up to 180 kg<sup>1</sup> compared with existing feral sheep in New Zealand which are up to 80 kg<sup>2</sup>. This difference in size would indicate that the impacts of argali on vegetation due to trampling and erosion would be greater than for existing feral breeds.

*"Argali will ...avoid forest and scrub (the ancient anti-predation strategy is deeply ingrained in all true wild sheep)."*

References suggest that this is not the case. Argali occupy a range of habitat types, including bushy landscapes and woods<sup>1</sup>.

### ***Environmental impacts of argali sheep***

Argali sheep are the world's largest sheep, weighing up to 180 kg<sup>1</sup>. They are adapted to harsh environments, inhabiting altitudes of 300m to 6100m<sup>1</sup>. Therefore the environmental impact of argali sheep or crossbred progeny would be potentially much greater than for other breeds of sheep already present in New Zealand.

Currently, six domestic sheep breeds have established feral populations in New Zealand<sup>2</sup>. Locations of feral populations on the mainland range from Hawke's

Bay to Southland, but self-sustaining feral populations have been present as far north as Raoul Island and as far south as Campbell Island. Domestic sheep crossbred with argali sheep could potentially establish populations in harsher environments, higher alpine areas, and wooded environments, making their environmental impacts greater than those of existing feral sheep.

### ***Risk of establishment in the wild***

We consider there to be a high risk of argali sheep establishing in the wild. A recent study found that of all the recent new populations of ungulate species in New Zealand, 65% were established as a result of either farm escapes or illegal liberations<sup>3</sup>. These risk scenarios are both applicable to argali sheep; firstly the intention of the importer is presumably to keep the sheep in a farm-type situation; secondly argali are a trophy-hunting species and appear, controversially, on several award categories of the Safari Club International<sup>4</sup>. Hunters in New Zealand have illegally released popular hunting species (e.g. sika deer) in order to establish new populations<sup>3</sup> and argali sheep might be released in the same way.

### ***Risk assessment process***

Given that the permit to import semen and tissues of argali sheep into New Zealand was into containment only, this species is still a new organism under the HSNO Act. In order to release the material or any progeny bred or cross-bred from the material, new organism approval from ERMA will be required.

Forest and Bird considers the development of an IHS for a species not yet approved for release to be premature. It may also prove to be a waste of MAF Biosecurity Authority's resources if the importer does not make a new organism application or if such an application is declined by ERMA.

It is not clear what the possible IHS will cover. The 2001 document suggests that the application for an IHS is intended to allow the use of argali semen to cross-breed with domestic sheep. However an IHS does not give any direction as to what the imported goods may be used for. Depending on what the IHS is issued for, it could allow the importation of other genetic material enabling the production of pure-bred argali progeny. This would be an even greater concern to Forest and Bird, however we note that even with the import of semen alone, selective breeding could be used to enhance the argali characteristics of crossbred progeny.

Finally, Forest and Bird is not impressed with the inadequate consideration of the risks to the New Zealand environment from the introduction of argali sheep. Initially, it appeared that MAF considered an assessment of agricultural disease risk alone to be an adequate basis on which to develop an import health standard, despite making no reference to risks to the environment. It now seems that a six-page synopsis produced eleven years ago is all MAF is requiring to be assured that the importation of argali sheep will not pose a risk to the environment. This is totally inappropriate.

Please feel free to contact me if you require further information on this submission.

Yours sincerely,



Karli Thomas  
Biosecurity Awareness Officer

- 
- <sup>1</sup> Mitchell-Jones, A. J. et al. (1999) The Atlas of European Mammals. Poyser Natural History, for the Societas Europaea Mammalogica.
  - <sup>2</sup> Rudge, M.R. (1990) Feral Sheep. In: The Handbook of New Zealand Mammals, King C (editor) Oxford University Press, Auckland
  - <sup>3</sup> Fraser, K. W.; Cone, J. M. and Whitford, E. J. (2000) A revision of the established ranges and new populations of 11 introduced ungulate species in New Zealand. Journal of The Royal Society, volume 30: number 4.
  - <sup>4</sup> The Humane Society of the United States (2001) Who does a sheep have to sue to get protection? <http://www.hsus.org/whatnew/argalisuit041901.html>

Note: Copies of these references can be provided if requested

**1.2.1** Forest and Bird are concerned that an inadequate risk assessment has been undertaken, particularly in terms of environmental impacts.

In addition, Forest and Bird “question why MAF has required an updated, independent disease risk assessment, but has not required an updated, independent environmental impact assessment”.

MAF comment:

As explained previously (see 1.1), at the time this application was initiated in 1990, MAF considered import applications for animal or animal products under the Animals Act. Applications to import a species not already present in New Zealand were required by MAF to include an Importation Impact Assessment (IIA) and a Disease Risk Assessment (DRA).

An IIA, which includes consideration of the environmental impact of Argali sheep, was submitted by the applicant and calls were made for public submissions.

However, before the completion of this application the HSNO Act and Biosecurity Act were enacted. With HSNO’s enactment, Argali sheep became a new organism under the HSNO Act, and consideration of the environmental impact of new organisms became the responsibility of ERMA.

Hence, although the environmental impact of this organism has already been considered by MAF under the Animals Act, this is no longer MAF’s role and accordingly MAF has not asked for another IIA to be performed. The risks, costs and benefits to the New Zealand environment will be assessed and considered by ERMA under the HSNO Act before Argali sheep, crossbred progeny, or germplasm can be released from containment. Opportunity will be given for public submissions on environmental impacts through ERMA’s review process.

The focus of the Biosecurity Act is the management of disease risks and the possibility of imported goods bringing unwanted organisms into New Zealand. Biosecurity issues are dealt with under the Biosecurity Act through the issuing of import health standards. MAF has required a disease risk analysis on Argali sheep semen to be submitted to support an import health standard under the Biosecurity Act.

MAF does not accept that the risk analysis that has been completed is inadequate.

The risk analysis follows the internationally recognised and accepted framework of the International Animal Health Code. The disease risk analysis has been subjected to MAF’s internal scientific review process and to independent expert review.

- 1.2.2** Forest and Bird are concerned about the “potential environmental impacts of any release of Argali sheep in New Zealand.”

MAF comment:

As stated, Argali sheep are considered new organisms under the HSNO Act. Therefore, this importation will have to obtain ERMA approval before the release from containment of any Argali sheep or germplasm will be allowed. Under the current legislation it is ERMA's responsibility to assess the environmental impact of new organisms and determine if they are eligible for release.

- 1.2.3** Forest and Bird assert that “the frame work for risk assessment has changed, particularly with regard to environmental risks which MAF now has a greater responsibility for assessing. The development of import health standards by MAF is now carried out under the Biosecurity Act, and MAF Biosecurity Authority has produced a policy on risk assessment. Both these documents specify that MAF must consider the potential effects on people, the economy and the environment of organisms that may be introduced as a consequence of importing risk goods (section 22(5) and section 5.6 respectively).”

MAF comment:

The focus of the Biosecurity Act is on the management of disease risks. Section 22(5)(a) requires that the Chief Technical Officer must consider whether the Argali sheep semen may bring organisms into New Zealand, and the possible effect of those organisms on people, economy and the environment, not the possible effect of the resulting sheep themselves. The disease risk analysis, presented for stakeholder comment, considers the organisms that the semen may bring into New Zealand, their consequences and recommends sanitary measures to prevent the introduction of unwanted organisms.

MAF believes it has fulfilled its responsibility to ensure that pests and unwanted organisms are not imported with semen from an Argali sheep in Singapore. Biosecurity clearance of Argali sheep progeny cannot be given until the requirements of an import health standard, based on the disease risk analysis, are fulfilled and ERMA approval is granted.

- 1.2.4** Forest and Bird are concerned about “the potential for intentional release and establishment of Argali sheep into the wild to satisfy demand for hunting, and implications for pest control.”

MAF comment:

Argali sheep are new organisms under the HSNO Act. It is ERMA's mandate to make decisions on applications to import new organisms. The environmental impact of Argali sheep will be examined by ERMA. ERMA's submission process is the appropriate forum for consideration of this concern.

**1.2.5** Forest and Bird express concern about “the process that has been followed in assessing the import risks associated with Argali sheep.”

**MAF comment:**

It is not clear from the submission statement exactly what part of the process is of concern to Forest and Bird. However, the overall content of the submission relates to environmental risks and, therefore, MAF interprets this statement as “the submitter is concerned that the environmental effects of this new organism have not been addressed under this process”.

MAF Biosecurity has followed its procedures in regard to the risk analysis process<sup>2</sup>. The Argali sheep semen import risk analysis was conducted by an external consultant (allowable under MAF Biosecurity policy), the document was subject to MAF’s internal scientific review and to an external expert scientific review, before the public submission process.

As stated earlier, given that Argali sheep is a new organism under the HSNO Act, it is not MAF’s mandate to assess the impact of this new organism on the environment. The environmental impact of Argali sheep will be examined by ERMA. MAF maintains that ERMA’s submission process is the appropriate forum for consideration of this concern.

**1.2.6** Forest and Bird contend that “Argali sheep are a risk good in that they constitute a risk, as their release in New Zealand would expose organisms (in particular alpine vegetation and ecosystems) to damage, loss and harm. Furthermore their release could interfere with the management of pests or unwanted organisms in New Zealand, in the same way that the presence of feral deer, and also to the management of other pests (including bovine tuberculosis and possums) where control methods reduce deer numbers.”

Forest and Bird further contend “given that Argali sheep are a risk good, MAF is therefore required to assess the potential impacts of their importation into New Zealand on the environment.”

**MAF comment:**

The definition of risk goods is only relevant for deciding whether or not section 22 of the Biosecurity Act applies, and an import health standard is required. Section 22 refers only to the likelihood of risk goods bringing organisms into New Zealand, not that the goods are the organisms themselves. Under this section, the Chief Technical Officer must consider whether the sheep semen may bring organisms into New Zealand, and the possible effect of those organisms, not the possible effect of the sheep. This is consistent with the focus on the management of disease risks in the Biosecurity Act.

Argali sheep are considered a new organism under the HSNO Act. It is ERMA’s area of responsibility to assess the potential impact of this new



species on the environment (including its effects on pest management programmes) and to prevent or manage the risks associated with its importation. Argali sheep, crossbred progeny or germplasm will only be released from containment if ERMA approval is given.

Further, the importation is of Argali sheep semen, not live Argali sheep. Argali sheep semen is a risk good under the Biosecurity Act because semen could harbour unwanted organisms. However, MAF believes it has fulfilled its responsibility to ensure that pests and unwanted organisms are not imported with the importation of semen from an Argali ram in Singapore. The semen is currently being held in a transitional and containment facility, and the organisms that the Argali semen might bring into New Zealand, and their consequences, are considered under the disease risk analysis. Argali sheep crossbred progeny can not be given biosecurity clearance for release until disease mitigation requirements, based on the disease risk analysis, have been fulfilled and ERMA approval has been granted.

- 1.2.7** Forest and Bird is of the opinion that the “synopsis of the environmental impact of proposed Argali sheep import to New Zealand prepared in 1990” is not an adequate assessment of the potential effects of Argali sheep on the New Zealand environment.

MAF comment:

This is a reiteration of a previous point (see 1.2.1). As stated previously, Argali sheep are a new organism under the HSNO Act. It is ERMA’s mandate to assess applications to import new organisms. ERMA will assess the impact of this new species on the environment and to prevent or manage the risks associated with importation.

- 1.2.8** Forest and Bird express concern that the report was prepared by the applicant.

MAF comment:

The IIA was written by the applicant, as was permitted under the Animals Act process. However, it was sent to 36 organisations for comment including government departments, universities, producer boards, industry groups, iwi, and environmental groups. Eighteen submissions were received and a summary prepared. The assessment process was not completed before the implementation of the HSNO Act.

The potential environmental impact of the release of Argali sheep will be considered by ERMA, if the importer applies for their release from containment.

**1.2.9** Forest and Bird express concern over the possible establishment feral populations of Argali sheep

MAF comment:

Given that Argali sheep are new organisms under the HSNO Act, it is ERMA's mandate to assess the impact of this new species on the environment and to prevent or manage the risks associated with importation. The environmental impact of Argali sheep will be examined by ERMA. MAF reiterates that ERMA's submission process is the appropriate forum for consideration of this concern.

**1.2.10** Forest and Bird assert that despite a permit to import semen and tissues of Argali sheep into containment, this species is still a new organism under the HSNO Act. Moreover, in order to release the material or any progeny bred or cross breed from the material, new organism approval from ERMA will be required.

MAF comment:

MAF agrees with this assertion. ERMA's approval is required for release from containment.

**1.2.11** "Forest and Bird considers the development of an IHS for a species not yet approved for release to be premature. It may also prove to be a waste of MAF Biosecurity Authority's resources if the importer does not make a new organism application or if such an application is declined by ERMA."

MAF comment:

As previously stated, this application met the criteria under the transitional provisions of the HSNO Act to allow importation of Argali sheep semen into containment under the Animals Act. The importer has been informed that both a disease risk analysis of Argali sheep semen (to support an import health standard under the Biosecurity Act), and an application to ERMA for an approval to release Argali sheep, crossbred progeny or germplasm from containment is required. The applicant has chosen to submit the required disease risk analysis first. It is MAF Biosecurity Authority's responsibility, following the disease risk analysis process, to ensure the risk analysis is robust enough to support an IHS under the Biosecurity Act.

**1.2.12** Forest and Bird suggest it is not clear what the possible IHS will cover. Stating "The 2001 document suggests that the application for an IHS is intended to allow the use of Argali semen to cross-breed with domestic sheep. However an IHS does not give any direction as to what the imported goods may be used for. Depending on what the IHS is issued for, it could allow importation of other genetic material enabling the production of prue-bred Argali progeny."

MAF comment:

The import heath standard will state the requirements to allow the importation of Argali sheep semen from Singapore. Direction as to how

risk goods may be used for once biosecurity clearance is given is outside the provisions of the Biosecurity Act. It has already been stated that biosecurity clearance will be given only to progeny of imported semen, not the semen itself.

- 1.2.13** Forest and Bird asserts that inadequate consideration of the risks to the New Zealand environment from the introduction of Argali sheep has occurred. Stating “initially, it appeared that MAF considered an assessment of argicultural disease risk alone to be an adequate basis on which to develop an import health standard, despite making no reference to risks to the environment. It now seems that a six page synopsis produced eleven years ago is all MAF is requiring to be assured that the importation of Argali sheep will not pose a risk to the environment.”

MAF comment:

This is a reiteration of previous comments. As explain previously under 1.2.1, the IIA (referred to in this submission as the ‘synopsis’) was required under the Animals Act 1967, before the enactment of the HSNO Act.

Given that Argali sheep are new organisms under the HSNO Act, under the current legislation it is ERMA's mandate to assess the impact of this new species on the environment and to prevent or manage the risks associated with importation. The environmental impacts of Argali sheep will be examined by ERMA, if the importer applies for their release from containment. MAF maintains ERMA's submission process is the appropriate forum for consideration of this concern.

### 3. Department of Conservation submission



Department of Conservation  
*Te Papa Atawhai*

6<sup>th</sup> December, 2001

Derek Belton  
Director  
Animal Biosecurity  
MAF Biosecurity Authority  
PO Box 2526  
WELLINGTON

Dear Derek

**DEPARTMENT OF CONSERVATION COMMENT ON THE IMPORT RISK ANALYSIS (DISEASE RISK ASSESSMENT): THE USE IN NEW ZEALAND OF IMPORTED SEMEN DERIVED FROM AN ARGALI (*Ovis ammon polii*) SHEEP**

Thank you for the opportunity to comment on the above import risk analysis. As MAF are aware, Argali (*Ovis ammon polii*) are a CITES species, not currently present in New Zealand. I have been informed by ERMA that the import into containment of Argali tissue is covered under a pre-HSNO approval and that any subsequent release of a hybrid Argali from containment would require ERMA approval under the HSNO Act. The potential risk that the progeny constituted to the New Zealand environment would be required to be assessed during this process.

However, in the event that the import semen is intended for progeny release at a later date, the introduction of Argali cross-bred sheep potentially poses a number of concerns; in particular, the pest potential of the cross-bred sheep appears to be uncertain<sup>1</sup>. As MAF appreciate, the development of an IHS must specify the requirements to be met for the effective management of risks associated with the importation of a risk good. The consideration of risks must include whether the good itself constitutes a risk to the environment (s2 Interpretation [risk good definition] & s22 Import health standards, Biosecurity Act). The Department considers it is important that the pest potential of the cross-bred Argali sheep is assessed in the context of the New Zealand environment in the IRA development phase.

Mitchell-Jones (1999 *et. al*)<sup>2</sup> state that *Ovis ammon* are the ancestor of the domestic sheep, occurring from Europe to Mongolia and are highly varied in phenotype and karyotype. Their habitat is also varied and includes open hill areas, bushy landscapes, woods, semi-deserts and high mountains. The species occur in altitudes from 300m up to 6100m. The different habitats and seasons produce a great adaptability to different foods. The diet of Argali includes grasses, sedges, herbs, shrubs, leaves, sedges, sage, lichens, bark, wood, seeds and fruit.

The closely related Mouflon have been imported as a game animal to Europe and now have widespread feral populations in many countries. Hybridisation with domestic sheep is reported<sup>3</sup>.

<sup>1</sup> This conclusion has been reached after reading Frontin-Rollet's (1990) paper in addition to the more recent literature outlined in these footnotes.

<sup>2</sup> Mitchell-Jones, A.J., Amori, G., Bogdanowicz, W., Krystufek, B., Reijnders, P.J.H., Spitzenberger, F., Stubbe, M., Thissen, J.B.M., Vohralik, V., Zima, J. (1999). The Atlas of European Mammals. Poyser Natural History.

<sup>3</sup> Bertolino, S., Brugnoli, A., Pedrotti, L. (1998). The Mouflon *Ovis [orientalis] musimon*; An Alien Species in the Italian Alps. Proc. 2<sup>nd</sup> World Conf. Mt Ungulates: 89-95.

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WGNCR-31614 - IRA Argali

Feral populations occurring from earlier introductions also occur in USA, Chile and Hawaii where they are considered destructive to endemic vegetation<sup>4</sup>. They have also been associated with the spread of weed species that are distributed via the faeces.

Whether cross-bred Argali sheep could become feral in New Zealand appears to be a subject of debate. However, King (1990)<sup>5</sup> reports examples where domestic sheep (Merino, Leicester, Romney, Cheviot, Lincoln and Corriedale) have become feral in parts of New Zealand and whose ranges overlap with feral goats, sika deer and pigs. King (1990) cites there are presently eight self-sustaining, unmanaged, truly feral discrete herds of sheep on the mainland. Their habitat includes rough pasture in broken scrub and forest from sea level to over 2000m. Feral populations graze on pasture and herbaceous plants and smaller proportions of woody plants. On Campbell Island, sheep and fire have combined to eliminate the large endemic herbs and palatable tussock grasses. From this it could be argued that, over time, cross-bred Argali sheep are likely to establish self-sustaining feral populations in New Zealand in the event of release.

Ease of eradication may be complicated by the fact that the Argali pure-bred species are considered one of the largest wild sheep in the world and have very spectacular horns. Consequently, cross-breeds are likely to be considered a trophy species by the hunting fraternity<sup>6</sup>. In the event of feral population establishment the Department could possibly anticipate similar hunting lobby issues in relation to eradication and illegal releases as has been experienced with species such as thar and deer respectively. Cross-bred Argali sheep could be expected to put further pressure on native herb and grassland ecosystems, many of which are already at risk from feral goats, chamois, thar, hare and rabbit<sup>7</sup>. Added to this the anti-predator strategy of feral sheep differs markedly from domestic sheep. When alarmed, feral sheep tend to run for wood cover, whereas domestic sheep generally run in the open<sup>4</sup>; this is particularly pertinent given that Argali are extremely fast runners (a strategy used to outdistance predators)<sup>5</sup>.

Due to the above factors, the Department considers that a thorough environmental impact assessment that covers the pest potential of cross-bred Argali sheep in the New Zealand environment should be undertaken before the import risk analysis can be considered sufficiently robust for an import health standard to be developed from. Thank you once again for the opportunity to comment on this import risk analysis.

Yours sincerely



Verity Forbes  
New Organisms Officer  
for Director General

cc: Geoff Hicks, CTO Conservation  
Anne Rose, ERMA

<sup>4</sup> Lever, C. (1985). Naturalized mammals of the world. Longman, London and New York.

<sup>5</sup> King, C.M. (1990) (ed). The Handbook of New Zealand Mammals. N.Z. Oxford University Press in association with the Mammal Society, New Zealand Branch. Auckland.

<sup>6</sup> Frontin-Rollet, A. (1990). A synopsis of the environmental impact of proposed argali sheep import to New Zealand. Unpublished paper.

<sup>7</sup> Bell, B.D. (QSM, FRAOU, FOSNZ) Wildlife Management International. Personal Communication, 2001.

- 3.1** The Department of Conservation considers the pest potential of cross-bred sheep to be uncertain. Particularly a concern is expressed over the possible establishment feral populations of Argali sheep and the cost of subsequent eradication.

MAF comment:

As previously stated in response to Forest and Bird's submissions (see 1.2.1, 1.2.6 and 1.2.9), given that Argali sheep are a new organism under the HSNO Act, it is ERMA's mandate to assess the impact of this new species on the environment and to prevent or manage the risks associated with importation. The environmental impact of Argali sheep may be examined by ERMA, if the importer applies for their release from containment. MAF considers that ERMA's submission process is the appropriate forum for consideration of this concern.

- 3.2** The Department of Conservation states that "the development of an Import Health Standard must specify the requirements to be met for the effective management of risks associated with the importation of a risk good. The consideration of risks must include whether the good itself constitutes a risk to the environment (s2 Interpretation (risk good definition) and s22 import health standards, Biosecurity Act)."

"The Department of Conservation considers that a thorough environmental impact assessment that covers the pest potential of cross-bred animals should be undertaken before the import risk analysis can be considered sufficiently robust for an import health standard to be developed from."

MAF comment:

MAF is responsible for issuing import health standards specifying the requirements to be met for the effective management of risks associated with the importation of risk goods.

The definition of risk goods is only relevant for deciding whether or not section 22 of the Biosecurity Act applies, and an import health standard is required. Section 22 refers only to the likelihood of risk goods bringing organisms into New Zealand, not that the goods are the organism themselves. Under that section, the Chief Technical Officer must consider whether the Argali sheep semen may bring organisms into New Zealand, and the possible effect of those organisms, not the possible effect of the sheep themselves. This is consistent with the focus on the management of disease risk in the Biosecurity Act.

Argali sheep are considered to be a new organism under the HSNO Act. The HSNO Act, not the Biosecurity Act, relates to the protection of the environment, and health and safety of people and communities, by preventing or managing the adverse effects of new organisms. It is ERMA's area of responsibility to assess the impact of this new species on the environment and to prevent or manage the risks associated with its importation. MAF is not required to duplicate ERMA's assessment of the potential environmental impact of new organisms.

MAF believes it has fulfilled its responsibility under the Biosecurity Act, to ensure that pests and unwanted organisms are not imported with Argali sheep semen. Biosecurity clearance of the Argali sheep progeny will not be given until MAF's disease mitigation requirements (based on a disease risk analysis) are fulfilled and ERMA approval for release is granted.

#### 4. Submission from Northern North Island Sheep Council

*More Profit from Sheep*

### **Submission on the risk analysis for the use of imported semen derived from an Argali (*Ovis ammon polii*) sheep.**

I consider the disease risk assessment is sound, if the recommendations in the report take place, and in addition the following also occurs:

- ♦ **Semen culture takes place on all batches of semen, for the culture of those organisms as specified in the report and this should also include mycoplasmas.**

Individual semen ejaculates do not always contain pathogenic organisms, due to intermittent shedding. (If there are only a few straws per batch (information not given in the report), then it should be possible to use a straw for both insemination and culture.)

It is uncertain whether Mycoplasmas survive in frozen semen. Although venereal transmission has not been implicated with Contagious agalactia, it is possible that this could occur. Sheep can appear clinically healthy although they are chronically infected. Serology is not always reliable.

- ♦ **The period of containment is greater than 3 years.**

In those diseases with long incubation periods (1-3 or more years) and where no tests are available for identification of infected animals, or where infected animals can give negative results in the available tests, the period of containment of inseminated ewes and their offspring should be longer than 3 years

- ♦ **The risk assessment also include the egg yolk component of the diluent .**

Diseases associated with poultry should be included in the risk assessment, as pathogenic organisms may be present posing a threat to birds or other animals.

- ♦ **The empty straws are disposed of by a recommended method.**

It is possible for used straws to be picked up by birds, chewed by sheep and cattle, as well as dogs.

It is also noted that the Disease Risk Assessment states that there were deaths of 2 female Argali in Singapore. However in the documentation provided from the Peoples Republic of China, only 1 female was exported to Singapore.

Jennifer Burton BVSc (Dist.)  
Northern North Island Sheep Council





- 4.1** The Northern North Sheep Council consider the disease risk assessment is sound, if the recommendations in the report take place and the following *additional* mitigating requirements are included in the Import Health Standard:
- 4.1.1** “Semen cultures take place on all batches of semen, for the culture of those organisms as specified in the report and this should also include mycoplasmas.”

MAF comment:

The Northern North Island Sheep Council has not stated which mycoplasma(s) they believe should be tested for. However, Mycoplasma species, have been isolated from sheep with balanoposthitis/vulvovaginitis (see Appendix 1). Carrier animals of Mycoplasma species occur in sheep<sup>3</sup>. Culture will be required of all batches of semen for the *Mycoplasma* spp., *Ureaplasma* spp., and *Acholeplasma* spp. stated in Appendix 1.

In the exposure assessment of enzootic abortion the risk analysis states that the ‘OIE recommends that semen donors be tested serologically for Chlamydia 2 to 3 weeks post collection and the semen cultured for *Chlamydia psittaci*.’ While it is likely rams play an insignificant role in transmission of *Chlamydia psittaci*<sup>4</sup>, infection of the male reproductive tract can occur<sup>5</sup>. *Chlamydia psittaci* has been isolated from the semen of experimentally infected rams<sup>4; 5; 6</sup>. Venereal transmission has been reported under experimental conditions<sup>4; 7</sup>. Culture and serological testing of the Argali ram semen will be required in accordance with OIE requirements.

- 4.1.2** “The period of containment is greater than 3 years.”

MAF comment:

MAF agrees with the submission that the period of time in quarantine of first generation progeny should be greater than 3 years to manage the scrapie risk appropriately. With respect to managing scrapie risk, it has been MAF policy in the past for progeny of low risk importations to be quarantined for 3 years and medium risk importations to be quarantined for 5 years<sup>8</sup>. As the scrapie status of China and Singapore is unknown, MAF considers these sources to pose a “moderate” scrapie risk. Therefore, the required quarantine period of first generation progeny shall be increased to 5 years.

At the end of the quarantine period all the first generation crossbred animals shall be slaughtered and necropsied for signs of exotic disease. Only second generation animals derived from embryos collected from the first generation crossbred animals, which have been transferred into New Zealand recipient ewes, shall be released. Release shall occur only after the first generation animals have completed 5 years quarantine and no signs of exotic disease are found.

**4.1.3** “The risk assessment also include the egg yolk component of the diluent.”

MAF comment:

MAF does not consider there is an ovine health risk posed by the egg yolk present in the diluent. The yolk is derived from eggs for human consumption and is present in very small volumes. MAF is not aware of any pathogen present in egg yolk that would be likely to establish an infection when administered by the intra-uterine route into sheep.

**4.1.4** “The empty straws are disposed of by a recommended method.”

MAF comment:

MAF considers that this requirement is already addressed in the Standard transitional facility operating procedure<sup>9</sup>. Veterinary supervision of the transitional facility is required. All waste material (empty semen straws would be considered waste material) must be disposed of by burial or incinerated. No contaminants may leave the transitional facility without a permit.

**4.2** The Northern North Island Sheep Council also noted “that the Disease Risk Assessment states that there are 2 female Argali in Singapore. However, in the document provided from the Peoples Republic of China, only 1 female was exported to Singapore.”

MAF comment:

MAF has contacted the proposed importer, who has provided confirmation that two Argali ewes and one Argali ram were imported from China to Singapore.

## **5. Submission from Kevin Corrin, MAF Animal Biosecurity**

**From:** Kevin Corrin  
**To:** Martin van Ginkel  
**Date:** 17/12/2001 14:58:23  
**Subject:** Submission on risk analysis for the use of imported Argali semen

Martin

The semen originates from an Argali ram whose flock of origin is unknown. If we are to follow the policy of the past then we need to consider the scrapie status of the country of origin and the nature of the genetic material when formulating our SFAP.

Sheep embryo importations from countries claiming scrapie freedom have had to follow an SFAP of 3.5 years or thereabouts.

Sheep semen imported from the UK, a scrapie endemic country, have a 5 year SFAP. I believe that the Argali should have to meet a similar requirement because the flock of origin is unknown. The 3 year quarantine recommended in the present risk analysis is not appropriate unless there is some new evidence to show otherwise.

Kevin

- 5.1** Kevin Corrin contends that the semen originates from an Argali ram flock of origin unknown. He referred to long-standing MAF policy that requires the scrapie status of the country of origin and the nature of the genetic material be considered when formulating a Scrapie Free Assurance Programme.

MAF comment:

MAF agrees with the submission that the period of time in quarantine of animals born from imported semen should be increased from 3 to 5 years. In managing scrapie risks, it has been MAF policy in the past for progeny of low risk importations to be quarantined for 3 years and medium risk importations to be quarantined for 5 years<sup>8</sup>. As the disease status of China and Singapore is unknown, MAF considers these sources pose a “moderate” scrapie risk.

## APPENDIX 1: *Mycoplasma*, *Ureaplasma*, and *Acholeplasma* species in sheep

Mycoplasmas and ureaplasmas belong to the class Mollicutes and family Mycoplasmataceae<sup>10</sup>. *Acholeplasma* belong to the class Mollicutes and family Acholeplasmataceae<sup>10</sup>.

The organisms in these families have some of the smallest genomes recorded for prokaryotes<sup>10</sup>. Mycoplasmas have been implicated as causal agents in a number of important sheep and goat diseases including: contagious agalactia, ovine non-progressive pneumonia and contagious caprine pleuropneumonia. Infections of mycoplasmas are commonly associated with the mucous and serosal membranes of the respiratory tract, urogenital tract, mammary gland, joint and eye. Although mycoplasmas are largely host specific, closely related animal species may share the same mycoplasma species<sup>10; 11</sup>

Contagious agalactia, in which *Mycoplasma agalactiae* has been implicated<sup>11</sup>, has been reported from the continent of Asia, including the People's Republic of China<sup>12</sup>. No reports were found of contagious agalactia occurring in Singapore.

*Mycoplasma*, and *ureaplasma*, species have been isolated from the genital organs of healthy sheep and rams and ewes with clinical signs of balanoposthitis/vulvovaginitis<sup>3; 13; 14; 15</sup>. The cause(s) of this condition is uncertain, but is considered to involve an infectious agent and may have a multifactor etiology. Evidence suggests mycoplasma/ureaplasma infections are causal factors in the disease in sheep<sup>14; 15; 16</sup>. Vulvovaginitis has been induced in ewes and nanny-goats by application of a combination of some mycoplasma cultures to vaginal mucous membranes<sup>16; 17</sup>. Similarly, lesions have also been induced following experimental inoculation of lambs with *Ureaplasma* spp. isolated from sheep with granular vulvitis<sup>15</sup>. Outbreaks of balanoposthitis and vulvovaginitis have been recorded in Australia, Canada, England, India, South Africa and the USA<sup>14</sup>. A similar syndrome is also reported in goats<sup>17</sup> and experimentally in cattle<sup>18</sup>.

The potential role of *Acholeplasma* spp. as disease causing agents is uncertain. *Acholeplasma* species have been isolated from animals with and without vulvovaginitis<sup>3; 13</sup>. *Acholeplasma granularum*, *Acholeplasma modium*, *Acholeplasma laidlawii*, and *Acholeplasma axanthum* have been isolated from the genital tracts of ewes<sup>3</sup>. No experimental studies were found examining the occurrence of disease in sheep following intravaginal inoculation with *acholeplasma*.

Venereal transmission of balanoposthitis and vulvovaginitis conditions is said to occur in sheep<sup>11; 14</sup>. Limited experimental work suggests that intravaginal inoculation of ewes with *Mycoplasma mycoides* subspecies *mycoides* (large colony type) may result in vulvovaginitis in ewes and balanoposthitis in rams mated to them<sup>16</sup>. Venereal transmission of ureaplasmas can occur in sheep. In one experimental study, ten ewes bred to a ram experimentally infected with and seminally excreting *Ureaplasma* serotype 1202 became culture positive to the ureaplasma after coitus<sup>19</sup>.

Artificial insemination may facilitate mycoplasma and ureaplasma transmission. Mycoplasmas have been isolated from the semen and preputial samples of rams<sup>3</sup> and ureaplasmas have been isolated from the semen of experimentally infected rams<sup>19</sup>. Mycoplasmas and ureaplasmas have frequently been isolated from semen of

bulls<sup>18; 20</sup>. *Mycoplasma bovis* has been demonstrated to adhere to the midpiece and tail of bovine sperm<sup>21</sup>. Adherence of ureaplasma to human semen has also been reported<sup>21</sup>. The intravaginal experimental placement of cultures of *Mycoplasma agalactiae* into goats, and *MmmLC* (cultured from ewes with clinical signs of vulvovaginitis) and *Ureaplasma* spp. into ewes, resulted in vulvovaginitis in the absence of sexual contact<sup>15; 16; 17</sup>.

*Acholeplasma* spp. have been cultured from the prepuce and semen of rams<sup>3</sup>, suggesting artificial insemination may facilitate transmission, but no experimental studies were found examining the transmission of disease in sheep following intravaginal inoculation with *Acholeplasma* spp.

Mycoplasma, ureaplasma, and acholeplasma subclinical carrier animals occur and may be important in the transmission of infection within and between flocks<sup>3; 14</sup>. Mollicutes have been isolated from the vagina and semen of apparently healthy ewes and rams<sup>3; 15</sup>. However, the period for which individuals carry mycoplasma, ureaplasma or acholeplasma before disease develops, if disease develops at all, is uncertain. In addition, the period of time individuals continue to shed organisms after recovery from infection is unclear. The shedding of *Ureaplasma* serotype 1202 has been shown to persist in semen for at least 120 days in experimentally infected rams<sup>19</sup>. Goats experimentally infected with *Mycoplasma agalactiae* were reported to have shed the organism in milk for at least 40 weeks<sup>22</sup>. *Mycoplasma* Serotype 11 (strain 2D) was isolated for at least 70 days post experimental intravaginal inoculation in ewes<sup>23</sup>.

No information was obtained regarding the survival of mycoplasma, ureaplasmas or acholeplasma in extended ram semen stored in vitro.

#### *Release assessment:*

The occurrence of subclinical carriers and the uncertainty regarding the disease history of the ram means that the possibility of infection of the ram cannot be ruled out.

Although no information has been found regarding experimental transmission of mycoplasma via infected semen without sexual contact i.e. by artificial insemination, subclinical carriers of mycoplasmas in semen occur and mycoplasmas can be transmitted by experimental vulval inoculation, suggesting artificial insemination may be able to transmit mycoplasma infections.

Similarly, artificial insemination may be able to transmit ureaplasma infections. Ureaplasmas have been transmitted to ewes by natural insemination from experimentally infected rams<sup>19</sup>. Ureaplasmas have been isolated from the semen of experimentally infected rams<sup>19</sup> and can be transmitted by experimental vulval inoculation<sup>15</sup>.

*Acholeplasma* spp. have been cultured from the semen and prepuce of rams<sup>3</sup>. No experimental studies were found examining the transmission of acholeplasma of disease in sheep following intravaginal inoculation with *Acholeplasma* spp.

#### *Exposure assessment:*

Direct contact with semen during artificial insemination would lead to exposure of New Zealand ewes.

#### *Consequence assessment:*

Experimental intravaginal inoculation of sheep and goats, implicates *MmmLC*, *Mycoplasma agalactiae*, and *Ureaplasma* spp. as causes of balanoposthitis and vulvovaginitis<sup>15; 16; 17</sup>. *MmmLC*, *Mycoplasma capricolum* subspecies *capricolum*, and *Mycoplasma agalactiae* have been isolated from clinically affected animals, and have been detected in either ram or bull semen<sup>3; 20; 24; 25</sup>. The role of many mycoplasmas and ureaplasmas isolated from sheep and goats is undefined. *Mycoplasma* Serotype 11 (strain 2D), *Mycoplasma alkalescens*, and *Mycoplasma bovis genitalium*, have been isolated from animals with clinical disease, but also from animals with normal reproductive performance and their importance as disease causing agents in sheep is uncertain<sup>3; 13; 14; 24</sup>. *Mycoplasma bovis genitalium* is associated with decreased reproductive performance in cattle<sup>18</sup>.

The consequences of balanoposthitis and vulvovaginitis conditions of sheep occurring in New Zealand would be directly related to disease control costs and decrease lambing percentages.

*Mycoplasma agalactiae* is associated with contagious agalactia in sheep and goats, an OIE list A disease<sup>12</sup>. The consequences of the introduction and establishment of this organism would include disease control costs, control efforts and any export restrictions imposed by trading partners.

The potential role of *Acholeplasma* spp. as disease causing agents is uncertain. No experimental studies were found examining the occurrence of disease in sheep following intravaginal inoculation with *Acholeplasma* spp.

#### *Risk estimation:*

*MmmLC*, *Mycoplasma agalactiae* and *Ureaplasma* spp. have been implicated as causes of balanoposthitis and vulvovaginitis in sheep and goats<sup>15; 16; 17</sup>. *Mycoplasma bovis genitalium*, *Mycoplasma agalactiae*, *Mycoplasma* Serotype 11 (strain 2D) and, after experimental inoculation, *Ureaplasma* serotype 1202 have been isolated in ram semen<sup>3; 19; 24</sup>. *Mycoplasma capricolum* subspecies *capricolum*, *Mycoplasma alkalescens*, *Mycoplasma bovis*, *Ureaplasma* spp., and *Mycoplasma* sp. Group 7<sup>20; 25</sup> have been isolated from bull semen. In view of this, and given that the period of time rams might be subclinical carriers of mycoplasmas and ureaplasmas is uncertain, safeguards are appropriate.

In single reports, *Acholeplasma laidlawii* has been isolated from ram semen<sup>3</sup> and *Acholeplasma axanthum* has been isolated from the swabs of vulval scabs in ewes<sup>13</sup>. *Acholeplasma* species have been isolated from the reproductive tracts of sheep<sup>3</sup>. No experimental studies were found examining the occurrence of disease in sheep following intravaginal inoculation with *Acholeplasma*. The importances of *Acholeplasma* spp. as reproductive tract disease causing agents are uncertain.

*MmmLC*, *Mycoplasma alkalescens*, and *Acholeplasma laidlawii*<sup>26; 27; 28</sup> are present in New Zealand and are not under an eradication program. Therefore, no sanitary measures are required.

The mycoplasma species listed below are exotic to New Zealand and have been isolated from sheep with balanoposithitis or vulvovaginitis<sup>13; 14</sup> and have been shown to be present in semen or preputial washings. Sanitary measures for these organisms are appropriate:

- *Mycoplasma capricolum* subspecies *capricolum*
- *Mycoplasma bovis*
- *Mycoplasma agalactiae*
- *Mycoplasma* Serotype 11 (strain 2D)
- *Mycoplasma* sp. Group 7
- *Mycoplasma bovis*

#### Risk Management:

The International Animal Health Code chapter on contagious agalactia does not provide recommendations applicable to sheep semen.

Measures required for semen: Each batch of semen should be cultured for mycoplasmas, ureaplasmas, and acholeplasmas. If mycoplasma, ureaplasma or acholeplasmas are isolated, the species will be determined.

The organisms *Mycoplasma putrefaciens*, *Mycoplasma capricolum* subspecies *capripneumoniae*, and *Mycoplasma* sp. F38<sup>25; 29</sup> are associated with significant clinical disease in sheep and goats. If any of these mycoplasmas, *Mycoplasma mycoides* subspecies *mycoides* small colony (MmmSC), exotic *Ureaplasma* spp., exotic *Acholeplasma* spp. or those mycoplasmas listed under the risk estimation are detected in any of the three batches, none of the semen may be used in New Zealand.



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