



**IMPORT RISK ANALYSIS FOR THE
IMPORTATION OF CAMELIDS FROM CHILE
AND PERU**

FINAL REPORT

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EXECUTIVE SUMMARY

This final report includes the comments received from respondents over the 2 year period since the initial report was circulated. The proposed conditions circulated in November 1998 were for camelids from Argentina, Bolivia, Chile and Peru however the final conditions are only for camelids from Chile and Peru.

The hazards identified includes various pathogens and weed seeds and plant pests which could be introduced into Australia with camelids from Chile and Peru.

Pathogens identified as requiring risk management include:

- . foot and mouth disease virus
- . vesicular stomatitis virus
- . bluetongue virus
- . epizootic haemorrhagic disease virus
- . bovine pestivirus
- . *Mycobacterium bovis*
- . *Mycobacterium paratuberculosis*
- . *Brucella abortus*
- . *Brucella melitensis*
- . *Mycoplasma mycoides capricolum* Biotype 38
- . *Trypanosoma vivax*
- . *Trypanosoma cruzi*
- . *Psoroptes spp* ear mites, and
- . internal and external parasites.

Risk management measures adopted for pathogens include:

- . country freedom certification
- . area freedom certification
- . herd history
- . restricted eligibility
- . pre-export quarantine
- . an option of either off-shore quarantine or post-arrival quarantine
- . testing for antibodies
- . testing for antigen
- . faecal culture
- . treatment of parasites, and
- . veterinary inspection.

Risk management measures adopted for weed seeds and plant pests include:

- . shearing
- . quarantine
- . restricted access to feed, and
- . inspection by a weed seeds expert.

ABBREVIATIONS AND ACRONYMS

AAHL	Australian Animal Health Laboratory, Geelong
AQIS	Australian Quarantine and Inspection Service
AQPM	Animal Quarantine Policy Memorandum
BAPA	buffered acidified plate antigen test
BRSV	bovine respiratory syncytial virus
BT	bluetongue
BTV	bluetongue virus
BVD	bovine viral diarrhoea
BVDV1	bovine viral diarrhoea virus 1
BVDV2	bovine viral diarrhoea virus 2
CFIA	Canadian Food Inspection Agency
CONACS	Consejo Nacional de Camelidos Sudamericanos
EITB	enzyme-linked immunoelectrotransfer blot assay
ELISA	enzyme-linked immunosorbent assay
EHD	epizootic haemorrhagic disease
EHDV	epizootic haemorrhagic disease virus
EU	Member States of the European Union
FMD	foot and mouth disease
FMDV	foot and mouth disease virus
IHA	indirect haemagglutination
JD	Johne's disease
MD	mucosal disease
NZ	New Zealand
NZ MAF	New Zealand Ministry of Agriculture and Forestry
OIE	Office International des Epizooties
OP	oesophageal-pharyngeal
OSQ	off-shore quarantine
PAQ	post-arrival quarantine
PCR	polymerase chain reaction
PEQ	pre-export quarantine
SAC	South American camelids
SPAR	Sociedad Peruana Alpaca Registrados
SPT	standard plate test
USA	United States of America
VS	vesicular stomatitis
VSV	vesicular stomatitis virus

1 INTRODUCTION

1.1 SCOPE OF THE RISK ASSESSMENT

The original report assessed the risks of importing camelids from South American countries. The conditions proposed in November 1998 were for Chile, Peru, Argentina and Bolivia. Difficulty was experienced in establishing appropriate dialogue with the authorities in Bolivia and this country has not been included as a possible source of camelids in this report. The authorities in Argentina wished to link discussions over the conditions for camelids with future wider trade negotiations and agreements. This report, therefore, assesses the risks of importing South American camelids (SAC) from Chile and Peru, countries for which there are current import conditions – the attached conditions are, in reality, a revision of current conditions.

There are four species of SAC – the llama (*Lama glama*), the alpaca (*Lama pacos*), the guanaco (*Lama guanicoe*) and the vicuna (*Vicugna vicugna*). Import conditions are restricted to the two domesticated species – the llama and the alpaca.

This final risk assessment report:

- identifies animal pathogens which may affect SAC
- assesses which pathogens would be of biosecurity concern with the importation of SAC
- assesses the risk of introducing weed seeds and plant pests with SAC
- identifies risk management options, and
- presents conditions to be adopted for the importation of llama and alpaca from Chile and Peru.

1.2 CURRENT QUARANTINE POLICY AND PRACTICE

There are current conditions for the importation of camelids from Peru, Chile, New Zealand (NZ) and the United States of America (USA). The conditions for the importation of camelids from NZ and the USA reflect the concerns associated with importation from South America. This report will address those concerns in the light of current knowledge and reassess the content of import conditions in this light and in respect of Australia's obligations under international trade agreements.

An assessment of the animal health risks associated with the importation of camelids from South America was circulated for comment in March 1998. Many comments were received and most incorporated into proposed conditions circulated for comment on 6 November 1998. These proposed conditions created much interest and produced much comment. AQIS response to these comments are attached to the Animal Quarantine Policy Memorandum (AQPM) accompanying this report.

2 HAZARD IDENTIFICATION

Camelids are not true ruminants and share only distant phylogenetic links with cattle and sheep; thus it is naïve to expect camelids to be affected by all the significant ruminant diseases. It is also naïve to equate the animal health risks to Australian livestock industries associated with the importation of live camelids with those associated with the importation of live ruminants. Cattle and sheep are closely related members of the Family Bovidae but share few diseases – of the 63 significant animal diseases exotic to Australia 10 affect cattle but not sheep, 11 affect sheep but not cattle but only 8 affect both sheep and cattle (Geering WA, Forman AJ and Nunn MF 1995) . It is a logical assumption that the greatest animal health risks associated with the importation of camelids from South America are from camelid diseases which only affect other

camelids. Available evidence indicates that if all the camelids imported into Australia to date had been imported after 30 days quarantine without disease testing, treatment or post-arrival quarantine, the health status of Australia's livestock industries, except for the camelid industry, would not have been adversely affected.

Camelids have been available for export from Chile, Peru and Bolivia where they are run above 4000m on the cold, semi-arid altiplano isolated from other livestock industries (Millar HW 1992).

2.1 DISEASES REPORTED IN SOUTH AMERICAN CAMELIDS AND THEIR STATUS IN AUSTRALIA

The information in the following charts was gleaned from the references listed at the end of this document.

Viral diseases

Disease	Agent	Status in Australia (- exotic + endemic)
foot and mouth disease	FMDV serotypes A, O and C	-
vesicular stomatitis	VSV, New Jersey and Indiana strains	-
rabies	rabies virus	-
bluetongue	bluetongue virus (BTV)	exotic strains
epizootic haemorrhagic disease	epizootic haemorrhagic disease virus (EHDV)	exotic strains
equine rhinopneumonitis	equine herpes virus 1	+
contagious ecthyma	orf	+
adenovirus infection	adenovirus	?
bovine syncytial respiratory disease	bovine syncytial respiratory virus	?
bovine viral diarrhoea	bovine pestivirus	exotic strains

Bacterial diseases

Disease	Agent	Status in Australia
tetanus	<i>Clostridium tetani</i>	+
enterotoxaemia	<i>Cl perfringens</i>	+
malignant oedema	<i>Cl septicum</i>	+
tuberculosis	<i>Mycobacterium bovis</i>	-
Johne's disease	<i>Mycobacterium paratuberculosis</i>	+
anthrax	<i>Bacillus anthracis</i>	+
brucellosis	<i>Brucella melitensis</i>	-
listeriosis	<i>Listeria monocytogenes</i>	+
colibacillosis	<i>Escherichia coli</i>	+
leptospirosis	<i>Leptospira</i> spp	serotypes
necrobacillosis	<i>Fusobacterium necrophorum</i>	+
lumpy jaw	<i>Actinomyces lamae</i>	?
nocardiosis	<i>Nocardia asteroides</i>	+
mycoplasmosis	<i>Mycoplasma mycoides mycoides</i> , <i>Mycoplasma</i>	+

	<i>capricolum</i> the F38 biotype (serology only)	-
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Fungal diseases

Disease	Agent	Status in Australia
ringworm	<i>Trichophyton verrucosum</i> , <i>Tri. Mentagrophytes</i>	+
candidosis/monilosis	<i>Candida albicans</i>	+
aspergillosis	<i>Aspergillus fumigatus</i>	+
coccidioidomycosis, valley fever	<i>Coccidioides immitis</i>	-
murcormycosis	<i>Rhizopus</i>	?

Protozoal diseases

Disease	Agent	Status in Australia
surra (Mal de Caderas)	<i>Trypanosoma evansi</i>	-
Chagas' disease	<i>Trypanosoma cruzi</i>	-
nagana	<i>Trypanosoma vivax</i>	-
coccidiosis	<i>Eimeria punoensis</i> , <i>E. alpaca</i> , <i>E. lamae</i> , <i>E. macusaniensis</i> , <i>E. peruviana</i>	+ -
sarcocystosis	<i>Sarcocystis auchenia</i> , <i>S. tilopoda</i>	+
toxoplasmosis	<i>Toxoplasma gondii</i>	+
cryptosporidiosis		+

External parasites

Disease	Agent	Status in Australia
mange	<i>Sarcoptes scabiei</i> , <i>Chorioptes bovis</i>	+
ear mite	<i>Psoroptes aucheniae</i>	- ?
ticks	<i>Amblyomma</i> , <i>Otobius megnini</i>	-
lice	<i>Microthoracius praelongiceps</i> , <i>Micro. Mazzei</i> , <i>Micro. Minor</i> , <i>Micro. Cameli</i> , <i>Damalina breviceps</i>	+ -
bots	<i>Cephenemyia</i>	-
screw worm fly	<i>Cochliomyia hominivorax</i>	-

Internal parasites

Disease	Agent	Status in Australia
tapeworms	<i>Moniezia</i> , <i>Taenia</i> .	+ -
stomach worms	<i>Haemonchus</i> , <i>Ostertagia</i> , <i>Camelostrongylus</i> , <i>Teladorsagia</i> , <i>Trichostrongylus</i> , <i>Marshallagia</i> , <i>Gongylonema</i> , <i>Spiculopteragia peruvianus</i>	+ -
Intestinal nematodes	<i>Lamanema chavezii</i> , <i>Cooperia</i> , <i>Haemonchus</i> , <i>Oesophagostomum</i> , <i>Trichuris</i> , <i>Strongyloides</i> , <i>Capillaria</i> , <i>Graphinema</i> , <i>Nematodirus</i> , <i>Bunostomum</i> , <i>Lamanema chavezii</i> , <i>Chabertia</i> , <i>Cooperia</i>	+ -
lungworms	<i>Dictyocaulus</i>	+

meningeal worm	<i>Parelaphostrongylus tenuis</i>	-
hydatidosis	<i>Echinococcus granulosus</i>	+
trematodes	<i>Fasciola hepatica, Fascioloides magna</i>	+ -
eye worm	<i>Thelazia</i>	-

2.2 DISEASES REPORTED IN CAMELIDS IMPORTED FROM SOUTH AMERICA

A large body of information on the health status of imported South American camelids has been gathered over the last 20 years. Information has been obtained from Canada, NZ and Australia. These countries have imported camelids from Chile, Peru and Bolivia using similar animal health requirements.

Over 4 600 camelids have been imported into Australia from South America. These animals have been tested for all the significant diseases without any diseased animals detected. Recent importations of camelids commenced in 1990 and the health of these animals has been well monitored by private and government veterinarians. After release from quarantine the only significant contagious diseases reported in camelids have been Johne's disease and *Psoroptes aucheniae* infestation.

The disease history of camelids in Australia is paralleled in Canada where 700 camelids have been imported from South America. No clinical, serological or post-mortem evidence of FMD, VS, Tb, Brucellosis or nagana was detected and no contagious diseases have been diagnosed in camelids after release from quarantine. (W.Warrell, CFIA *pers comm*)

Between 1988 and 1991 NZ imported 3300 camelids from Chile. These animals were subjected to an equivalent pre-import testing program to those imported by Australia without the detection of significant diseases. During post-arrival quarantine (PAQ) positive reactors to serological testing for FMD were detected. It was concluded that these reactors had been vaccinated against FMD. Serological evidence of Q fever, a disease not present in NZ, was detected during PAQ as were *Nematodirus battus* an internal parasite exotic to both Australia and NZ (Jean-Marie Derouet, NZ MAF *pers comm*). Other than BVD, none of the diseases of concern listed in this report were detected in camelids in NZ (Arthur DG 1997).

The experience of countries importing camelids from South America supports reports by veterinary authorities in South America (Ministerio de la Presidencia, Consejo Nacional de Ciencia y Tecnologia 1987) and others (Fowler ME 1998) that South American camelids are rarely affected by the significant diseases of domestic ruminants.

3.4 RISK ASSESSMENT

The following viral, bacterial, fungal and protozoal diseases, external and internal parasites and weed seeds and plant pests are of quarantine concern and risk management measures are required. These are detailed in Section 5.

3.5 VIRAL DISEASES

Adenovirus infection has been reported as common in llamas in North America (Post Graduate Foundation in Veterinary Science University of Sydney (1996) Proceedings 278, *Camelid Medicine and Surgery* 3). The most commonly isolated antibodies are to llama adenovirus which has been associated with disease in llamas. Two species of adenovirus have been isolated from llamas neither of which are antigenically related to the adenoviruses of other domestic animals. Llama adenoviruses, as with other adenoviruses, typically

infect a large percentage of a population with very few animals showing clinical disease. Camelids previously imported into Australia have not been tested for adenovirus and it is most likely that the adenoviruses affecting South American camelids are already established in Australia. For these reasons adenoviruses are not considered to have quarantine significance.

Bovine syncytial respiratory virus (BRSV) has not been isolated in Australia but is considered to be a ubiquitous virus associated with respiratory disease in ruminants. In one serological survey antibodies to BRSV were detected in 16% of Peruvian alpacas (Rivera H, Madewell BR and Meghino E 1987).

Viral diseases of concern are those serious diseases (OIE Lists A and B and other diseases considered to be significant) that occur in South America but are exotic to Australia, or those where the South American strains are different to the strains which occur in Australia. These diseases include:

- . foot and mouth disease
- . vesicular stomatitis
- . rabies
- . bluetongue and epizootic haemorrhagic disease, and
- . bovine pestivirus.

3.1.1 Foot and mouth disease (FMD)

FMD is endemic in Peru but Chile has met the OIE criteria for a foot and mouth disease free country without vaccination since 1981. However evidence of illicit vaccination of alpacas has been detected in alpacas being exported from Chile to Canada, NZ and Australia (Agriculture and Agri-Food Canada 1997).

Three strains of FMD, described as O, A and C are found in South America. SAC can be infected with FMD virus but are not as susceptible as cattle and other ruminants (Fowler ME 1998). Trials designed to determine the susceptibility of llamas to infection with O, A and C strains provided evidence that llamas are resistant to FMD infection and that they would play only a minor role, if any, in transmitting the virus to domestic stock (Fondevila NA *et al* 1995). In these trials susceptible llamas were housed for 4 days in direct contact with virus shedding FMD infected pigs. None of the 30 llamas exposed directly to pigs infected with A and C strains developed any clinical, antigen or antibody evidence of FMD. Two llamas exposed to pigs shedding O strain developed barely detectable lesions and, together with a third llama without lesions, became serologically positive. In another study FMD virus could not be recovered from infected llamas longer than 14 days after infection. This study also showed that, within a laboratory, transmission was possible from cattle to llamas and llamas to cattle (Lubroth Y *et al* 1990).

It is reported that significant levels of virus can be detected in cattle OP fluid up to 42 months after infection. A small percentage of the cattle that become persistent carriers produce no humoral antibody but there are no unequivocal reports of these persistent carriers transmitting FMD. In rare instances carrier cattle have been reported as initiating field outbreaks of FMD more than two years after becoming infected (Thomson GR 1996).

SAC do not become carriers of the FMD (Fowler ME 1998) nor is there any evidence that camelids play any part in the epidemiology of FMD.

3.6 Vesicular stomatitis (VS)

SAC appear to be very resistant to VS even when in close contact with infected animals however vesicles were reported in one llama during the 1995 outbreak in the USA (Post Graduate Foundation in Veterinary Science University of Sydney 1996). SAC can be infected by intradermal injection on the dorsum of the tongue which produced localised vesicles. Other methods of infection including intra muscular injection, rubbing the virus on the tongue and cohabiting with infected animals were unsuccessful (Fowler ME 1998).

3.1.2 Rabies

Rabies is endemic in South America and outbreaks have been reported in SAC. Dogs have been incriminated as transmitters of rabies to alpacas but there have also been reports of rabid alpacas transmitting rabies to other alpacas. Incubation periods in one outbreak of rabies in Peruvian alpacas was 15 to 34 days with affected animals dying 6-8 days after the development of clinical signs (Fowler ME 1998).

3.1.3 Bluetongue (BT) and epizootic haemorrhagic disease (EHD)

Both BT and EHD are endemic in South America, the strains are similar to those in North America and are exotic to Australia. Antibodies to BT have been detected in SAC but there are no reports of natural disease and it is not clear if SAC develop infective viraemias (Fowler ME 1998). No reports were found of EHD in SAC.

3.7 Bovine pestivirus.

Antibodies to bovine pestivirus have been detected in SAC but the significance of the bovine pestivirus infections is unclear. The sero prevalence in serological surveys in North America was low and was related to exposure to cattle. The virus appears to replicate for only a short time within conjunctival or enteric mucous membrane and buffy cell coats (Post Graduate Foundation in Veterinary Science University of Sydney 1996).

Diseases caused by bovine pestivirus, commonly referred to as bovine viral diarrhoea virus (BVDV), include bovine virus diarrhoea (BVD) and mucosal disease (MD). There are two biotypes of pestivirus that are serologically indistinguishable.

Not only are there 2 biotypes of bovine pestivirus, there are also 2 genotypes, 1 (BVDV1) and 2 (BVDV2) infecting cattle. Each genotype can be either cytopathic or non-cytopathic. BVDV2 is more pathogenic and virulent strains can cause severe haemorrhaging with high mortality rates. However, most strains of BVDV1 are not virulent and cause almost unnoticeable disease.

BVDV1 has a world-wide distribution and is widespread in Australia, infecting a significant proportion of beef and dairy herds. BVDV2 is usually more pathogenic and is known to exist in North America, Japan and some European countries however it is not known to occur in Australia or New Zealand.

3.2 BACTERIAL DISEASES

The bacterial diseases of concern are those which have been reported in SAC but do not occur, or are subject to eradication programs, in Australia. Those identified are:

- . tuberculosis
- . Johne's disease
- . *Brucella melitensis* infection

- . *Brucella abortus* infection, and
- . Mycoplasmosis.

3.2.1 Tuberculosis (Tb)

Tb is not a major disease of camelids but both natural and experimental infections have been reported. Most infections have occurred when camelids have lived in close association with other infected animals and/or humans (Fowler ME 1998). Tb has not been reported in camelids from the altiplano and veterinary authorities in Chile maintain that the disease does not occur in free ranging camelid populations (Millar HW 1992). All SAC imported into Australia, Canada, NZ and the USA have been subjected to testing for Tb without any reports of infected animals having been detected. Nor have there been any reports of Tb in imported animals except in zoos in Europe. Assessment of the sensitivity and specificity of tuberculin testing in camelids has never been determined probably because there has never been enough infected camelids for assessment.

From the lack of evidence and experience with the testing and importation of camelids it would appear that the risk of importing a tuberculous camelid is very low, probably much lower than the risk of visitor/tourist with tuberculous.

3.2.2 Johne's disease (JD)

JD has been detected in alpacas in Australia and in llamas in North America and Scotland. Of the 23 Australian cases of JD disease, diagnosed either by histopathology and/or faecal culture, by 1996 all were caused by the bovine strain of *Mycobacteria paratuberculosis* (Post Graduate Foundation in Veterinary Science University of Sydney 1996) and most were from a shipment of alpacas from Chile which were imported via New Zealand. JD has not been reported in camelids in South America although the disease is present in cattle in Chile (OIE World Animal Health in 1998).

3.2.3 Brucella melitensis infection

No reports could be found of *Brucella abortus* infection in SAC however they are known to be susceptible to *Brucella melitensis* infection and outbreaks have been reported in a Peruvian herd and in zoo animals (Fowler ME 1998).

3.2.4 Mycoplasmosis

Neither Peru or Chile have ever reported contagious caprine pleuropneumonia. However an indirect haemagglutination (IHA) was used to detect antibodies to *Mycoplasma mycoides mycoides* LC and *M. m. capricolum* in Peru (Hung AL *et al* 1991). One alpaca also carried antibodies to *M. m. capricolum* biotype F38, believed to be the principal cause of contagious caprine pleuropneumonia. Disease caused by mycoplasmosis was not reported and the significance of the serology not determined. Contagious caprine pleuropneumonia has not been recorded in Australia and the possibility of camelids carrying biotype F38 cannot be entirely dismissed.

The role of camelids in the epidemiology of mycoplasmosis requires further investigation.

3.3 FUNGAL DISEASES

Coccidioidomycosis and mucormycosis are both fungal infections caused by soil dwelling fungi. Neither of these diseases have been reported in Australia which is more likely to indicate that the fungi have not become established rather than that the spores have never been brought to Australia. Coccidioidomycosis is more frequently reported in humans than animals and it is most unlikely that the spores are not regularly introduced into Australia on and in temporary or permanent human migrants.

3.8 PROTOZOAL DISEASES

Several species of the coccidia infecting alpacas have been reported in Australia (John Harkin *pers comm*). It could be expected that the range of *Eimeria* spp which infect camelids in Chile and Peru have been imported.

There are two pathogenic trypanosomes known to occur in Chile and Peru – *T. cruzi* and *T. vivax*. It is not known whether *T. vivax* or *T. cruzi* could become established if introduced however *T. cruzi* enjoys a large number of wildlife hosts, including marsupials, in South America and *T. vivax* appears to be transmitted without the aid of tsetse flies, the African vectors for this pathogen and other trypanosomes. Although trypanosomosis has not been reported in camelids in South America there could be a slight risk that an infected animal could be exported.

3.9 EXTERNAL PARASITES

All external parasites are of concern, particularly *Psoroptes aucheniae*.

3.10 INTERNAL PARASITES

The meningeal worm *Parelaphostrongylus tenuis* is a parasite of the white-tailed deer (*Odocoileus virginianus*) but has been recorded in sheep goats and some other deer. In other species the larvae do not enter the sub-dural space and mature into adults. SAC are thus end-hosts and are unable to spread this parasite.

Psoroptes aucheniae has attracted particular interest because of its morphological similarity to *Psoroptes ovis*. However it is now evident that this mite is host specific and although a serious parasite of camelids it does not pose a threat to other livestock industries. However as special effort has been directed toward keeping Australia free from this parasite.

Other internal parasites are of concern.

3.7 WEED SEEDS AND PLANT PESTS

There is a risk of weed seeds and plant pests may be introduced to Australia, from the country of export or an off-shore facility, either in or on SAC.

4 RISK MANAGEMENT OPTIONS

The risk management options available for managing the identified hazards associated with the importation of camelids from Chile and Peru include:

4.1 PATHOGENS

- . Country freedom certification.
- . Area or zone freedom
- . Property/premises freedom
- . History of herd of origin
- . Restricted eligibility

- . On-farm isolation
- . Pre-export quarantine
- . Off-shore quarantine
- . Post-arrival quarantine
- . Testing for antibodies or antigen
- . Faecal culture
- . Treatment for parasites
- . Veterinary inspection

4.2 WEED SEEDS AND PLANT PESTS

- . shearing
- . quarantine
- . restricted access to feed, and
- . inspection by a weed seeds expert.

5 RISK MANAGEMENT

5.1 GENERAL

5.1.1 Eligibility

The conditions include restrictions, placed on properties in Peru from which alpacas for export can be sourced. These restrictions are imposed by Consejo Nacional de Camelidos Sudamericanos (CONACS) through their register of breeders – the Sociedad Peruana Alpaca Registrados (SPAR). This register is designed by the Peruvian authorities to ensure that alpacas for export are only sourced from areas with appropriate health status and from breeders with certifiable animal health control programs and records.

5.1.2 Country, area, premises and herds of origin restrictions

The conditions require certification that the country of export is free from rinderpest and has been free from camel pox and haemorrhagic septicaemia during the 12 months prior to export. It is also required that during the 5 years prior to export JD was not reported or suspected on the properties of origin.

The PEQ premises must be either in a zone free from the competent vectors of bluetongue or enclosed so as to exclude such vectors. If an outbreak of FMD occurs within 80 km of the PEQ premises the consignment is ineligible for export.

5.2 DISEASES

5.2.1 Foot and mouth disease (FMD)

The relevant OIE Articles for ruminants and pigs provide a safe standard for camelids which are far less susceptible to FMD than either ruminants or pigs. For camelids from Chile Article 2.1.1.5. would apply:

Article 2.1.1.5.

When importing from FMD *free countries* or *zones where vaccination is practised*, *Veterinary Administrations* should require:

for domestic ruminants and pigs

the presentation of an *international animal health certificate* attesting that the animals:

- 1) showed no clinical sign of FMD on the day of shipment;
- 2) were kept in an FMD free country since birth or for at least the past three months; and
- 3) have not been vaccinated and showed a negative response to tests for antibodies against FMD virus, when destined to an FMD *free country* or *zone where vaccination is not practised*.

FMD free countries where vaccination is not practised may require additional guarantees.

For camelids from Peru Article 2.1.1.6. would normally apply although a variation is proposed in the following paragraphs:

Article 2.1.1.6.

When importing from FMD *infected countries* or *zones*, *Veterinary Administrations* should require:
for domestic ruminants and pigs

the presentation of an *international animal health certificate* attesting that the animals:

- 1) showed no clinical sign of FMD on the day of shipment;
- 2) were kept in the *establishment* of origin since birth or
 - a) for the past 30 days, if a *stamping-out policy* is in force in the *exporting country*,
 - b) for the past three months, if a *stamping-out policy* is not in force in the *exporting country*, and that FMD has not occurred within a ten-km radius of the *establishment* of origin for the relevant period as defined in a) and b) above;
- 3) were isolated for the 30 days prior to quarantine in an *establishment*, were subjected to diagnostic tests (probang and serology) for FMD with negative results, and that FMD has not occurred within a 10-km radius of the *establishment* during that period;
- 4) were kept in a *quarantine station* for the 30 days prior to shipment, were subjected to diagnostic tests (probang and serology) for FMD with negative results at the end of that period, and that FMD has not occurred within a 10-km radius of the *quarantine station* during that period;
- 5) were not exposed to any source of infection during their transportation from the *quarantine station* to the *place of shipment*.

In the above Article the diagnostic tests include both probang and serology. The probang has been used as a tool to assist in virus isolation as explained in this quote from the OIE Manual of Standards Chapter 2.1.1.:

Where epithelial tissue is not available from ruminant animals, for example in advanced or convalescent cases, or where infection is suspected in the absence of clinical signs, samples of oesophageal-pharyngeal (OP) fluid can be collected by means of a probang (sputum) cup (or in pigs by swabbing the throat) for submission to a laboratory for virus isolation.

There is no logical reason to use a probang cup for diagnosis where virus isolation is not necessary. The probang cup technique of collecting OP for detection of persistently infected carrier cattle is *inherently unreliable* (Thomson GR 1996). The only justification for the use of the probang for diagnosis would be if it was suspected that serologically-negative carrier animals existed and that virus was present in OP fluid. However the available evidence indicates that SAC do not harbour FMD virus in the pharyngeal region beyond the acute stage of infection (Thomson GR 1996).

The collection of OP using a probang cup causes considerable distress to SAC (J. Hayhoe, AQIS, *pers comm*), there is no evidence that its use assists in the diagnosis of FMD and there is no justification for its use.

The most suitable serological tests are the liquid-phase blocking enzyme-linked immunosorbent assay (ELISA) or the enzyme-linked immunoelectrotransfer blot assay (EITB) which are both highly sensitive to both post-infection and post-vaccination antibodies. The use of these diagnostic tests and the requirements of Article 2.1.1.6. should provide the starting point for determining the quarantine regimen for camelids from Peru but less stringent requirements are warranted for camelids from Chile.

FMD REQUIREMENTS IN THE CONDITIONS FOR CAMELIDS FROM PERU:

- The camelids must come from areas above 4 000m altitude known to be free from FMD. This area is known as the altiplano and there are very few cattle at this altitude with camelids the dominant livestock.
- The camelids must have not been in contact with cattle during the 12 months prior to export.
- The camelids have not been vaccinated against FMD.
- If there is an outbreak of FMD within 80 km of the pre-export quarantine (PEQ) premises during quarantine the consignment must be aborted.
- The camelids must give a negative result to either an ELISA or an EITB serological test for FMD antibodies on 2 occasions if they are being imported via the off-shore quarantine option or on 3 occasions if they are being imported using the on-shore option. During PAQ the animals must give a negative result to a serological test for FMD. This test and the second FMD test during PEQ must be done at the Australian Animal Health Laboratory (AAHL) at Geelong.
- During transport from PEQ to the port of embarkation the camelids must not pass within 80 km of livestock affected by an outbreak of FMD.

5.2.2 Vesicular stomatitis (VS)

There are two major strains, Indiana and New Jersey, found in South America. VS virus is not carried in the non-infected animal. As the infective period in livestock is 6 days the risks associated with this disease are adequately addressed by the quarantine periods. However, to provide extra confidence, a requirement that the SAC give negative results to two serological tests for VS have been included in the conditions for camelids from Peru. The first test is to be done on samples taken at the beginning of PEQ and the second test at the end of PEQ or during off-shore quarantine. This testing will indicate if the SAC were exposed to VS virus during PEQ. All approved PEQ facilities are in desert areas reported as being free from known disease vectors. VS has never been reported in Chile.

The relevant OIE *Code* Article is 2.1.2.6.:

Article 2.1.2.6

When importing from countries considered infected with VS, *Veterinary Administrations* should require:

for domestic cattle, sheep, goats, pigs and horses

the presentation of an *international animal health certificate* attesting that the animals:

- 1) showed no clinical sign of VS on the day of shipment;
- 2) were kept, since birth or for the past 21 days, in an *establishment* where no *case* of VS was officially reported during that period; or
- 3) were kept in a *quarantine station* for the 30 days prior to shipment and were subjected to a diagnostic test for VS with negative results at least 21 days after the commencement of quarantine;

- 4) were protected from insect vectors during quarantine and transportation to the *place of shipment*.

As option 2) requires records of VS being officially reported a modified option 3) has been adopted. The conditions require each camelids gave a negative result to an antibody test for VS at the beginning and at the end of PEQ. Seroconversions during PEQ would indicate VSV activity.

5.2.3 Rabies

The relevant OIE Code Article is 3.1.5.6.:

Article 3.1.5.6.

When importing from countries considered infected with rabies, *Veterinary Administrations* should require:

for domestic ruminants, equines and pigs

the presentation of an *international animal health certificate* attesting that the animals:

- 1) showed no clinical sign of rabies on the day of shipment;
- 2) were kept for the 6 months prior to shipment in an *establishment* where no *case* of rabies was reported for at least 12 months prior to shipment.

The rabies risk is managed by the inspection requirements at the end of each quarantine period.

5.2.4 Bluetongue (BT) and epizootic haemorrhagic disease (EHD)

The relevant OIE Code Article is 2.1.9.4.:

Article 2.1.9.4.

When importing from BTV free countries or zones, *Veterinary Administrations* should require:

for ruminants and other BTV susceptible herbivores

the presentation of an *international animal health certificate* attesting that the animals:

- 1) were kept in a BTV free country or zone since birth or for at least 60 days prior to shipment; or
- 2) were kept in a BTV free country or zone for at least 28 days, then were subjected, with negative results, to a serological test to detect antibody to the BTV group, such as the BT competition ELISA or the BT AGID test, and remained in the BTV free country or zone until shipment; or
- 3) were kept in a BTV free country or zone for at least 7 days, then were subjected, with negative results, to a BTV isolation test or polymerase chain reaction test on a blood sample, and remained in the BTV free country or zone until shipment;

AND

- 4) if the animals were exported from a free zone, either:
 - a) did not transit through an infected zone during transportation to the *place of shipment*; or
 - b) were protected from *Culicoides* attack at all times when transiting through an infected zone.

Having completed combined quarantine periods in bluetongue free zones the SAC would meet the requirements of option 1).

5.2.5 Bovine pestivirus infection [bovine viral diarrhoea (BVD), mucosal disease (MD)]

Although it is most unlikely that SAC carry bovine pestivirus until the situation is further clarified a requirement has been included that the SAC give a negative result to an antigen detection or virus isolation test during PEQ.

5.2.6 Bovine tuberculosis (Tb)

All available evidence indicates that Tb does not occur in range-fed SAC. The risk is further reduced by requiring that each SAC give a negative result to a single intradermal test during PEQ.

5.2.7 Johne's disease (JD)

In the Australian Johne's Disease Market Assurance Program for Alpaca, Rules and Guidelines May 1998, the only approved tests are *faecal and tissue culture, histopathological examinations and molecular biological methods such as polymerase chain reaction (PCR) and other DNA analyses*.

The conditions include a requirement that faecal samples from each SAC be subject to a radiometric culture for *Mycobacterium paratuberculosis* and that a negative result be obtained for each animal before they leave, either the PEQ premises, or the off-shore quarantine facility. A requirement has been added that the camelids originate from herds not known or suspected of being infected with JD.

5.2.8 Brucellosis (Br)

The requirements of OIE Code Articles 3.2.1.2. and 3.3.2.4. provide adequate security against the introduction of these two pathogens:

Article 3.2.1.2. BOVINE BRUCELLOSIS (*Brucella abortus* infection)

Veterinary Administrations of importing countries should require:

for cattle for breeding or rearing (except castrated males)

the presentation of an *international animal health certificate* attesting that the animals:

- 1) showed no clinical sign of bovine brucellosis on the day of shipment;
- 2) were kept in a herd in which no clinical sign of bovine brucellosis was officially reported during the six months prior to shipment;
- 3) were kept in a *country* or *part of the territory of a country free* from bovine brucellosis, or were from a *herd officially free* from bovine brucellosis and were subjected to a serological test for bovine brucellosis with negative results during the 30 days prior to shipment; or
- 4) were kept in a *herd free* from bovine brucellosis and were subjected to buffered *Brucella* antigen and complement fixation tests with negative results during the 30 days prior to shipment; if the cattle come from a herd other than those mentioned above:
- 5) were isolated prior to shipment and were subjected to a serological test for bovine brucellosis with negative results on two occasions, with an interval of not less than 30 days between each test, the second test being performed during the 15 days prior to shipment.

These tests are not considered valid in female animals which have calved during the past 14 days

Article 3.3.2.4. CAPRINE AND OVINE BRUCELLOSIS (*Brucella melitensis* infection)

Veterinary Administrations of importing countries should require:

for sheep and goats for breeding or rearing (except castrated males) destined for flocks officially free from caprine and ovine brucellosis

the presentation of an *international animal health certificate* attesting that the animals:

- 1) showed no clinical sign of caprine and ovine brucellosis on the day of shipment;
- 2) come from a *sheep* or *goat flock officially free* from caprine and ovine brucellosis; or
- 3) come from a *sheep* or *goat flock free* from caprine and ovine brucellosis; and
- 4) have not been vaccinated against brucellosis, or, if vaccinated, that the last vaccination was performed at least two years previously; and

- 5) were isolated in the *establishment* of origin, and were subjected during that period to a diagnostic test for caprine and ovine brucellosis with negative results on two occasions, at an interval of not less than six weeks.

The test requirements in the conditions include the options of using either a BAPA, SPT or ELISA. These tests detect antibodies to both *Br abortus* and *Br melitensis*.

5.2.9 Mycoplasmosis

The Peruvian conditions include a requirement that each camelid be tested for *M. m. capricolum* biotype 38 using the IHA test. If any reactors to the IHA are detected at least one should be autopsied and lung tissue subjected to one of the tests described in the OIE Manual of Standards to identify the organism.

5.2.10 Mycoses

Standard quarantine procedure of rejecting animals with dermatoses and/or respiratory symptoms will adequately manage the risk of introducing pathogenic fungi.

5.2.11 Trypanosomoses

Testing for trypanosomes using blood smears is insensitive and has not been included. Surra has never been recorded in either Chile or Peru and *Trypanosoma evansi* has not been detected in camelids exported from these countries. All testing requirements for *T. evansi* have been deleted from the conditions. However the serological tests for *T. vivax* and *T. cruzi* have been retained in both conditions.

5.2.12 Coccidiosis

Camelids host a specific range of coccidia. Treatment of camelids for export with coccidiostats before PEQ should be seen as health management rather than a quarantine requirement and no requirements for treatment for coccidiosis is included in the conditions. .

5.2.13 External and internal parasites

Broad spectrum treatment for both internal and external parasites before PEQ to reduce egg contamination of the premises should be part of animal health management. Some camelid parasites could be multi-host and different strains and/or species of parasites could be introduced with the introduction of live animals. Treatment of animals for export during PEQ to try and eliminate all internal and external parasites is standard quarantine practice and is included in the conditions.

The conditions include assessment and treatment requirements for the ear-mite *Psoroptes acheniae*.

5.3 WEED SEEDS AND PLANT PESTS

The conditions include requirements that the camelids:

- . were clean shorn during the first 14 days of PEQ
- . were clean shorn during the last 15 days of OSQ
- . did not have access to seeds of plants not present in Australia during the last 15 days of OSQ
- . were fed only fodder of either Australian or New Zealand origin during the last 15 days of OSQ, and
- . were inspected by an AQIS nominated weed seeds expert during the final 4 days of OSQ and the first 4 days of PAQ.

5.4 QUARANTINE

The following are the OIE Animal Health Code recommended quarantine periods, in days, for each relevant disease of concern.

Disease	Premises freedom	On-farm isolation	Pre-export
Foot and mouth disease	30 if stamping out policy	30	30
	90 if no stamping out policy		
vesicular stomatitis	21		30
rabies	180		
bluetongue			60

In the past it has proven that on-farm isolation is very difficult to manage in Chile and Peru and it has been more practical to do all the pre-export quarantine in the PEQ premises. The conditions do not include requirements for on-farm isolation.

Mandatory off-shore quarantine (OSQ) was not identified as necessary risk management measure however it was accepted that OSQ is a legitimate alternative to lengthy PEQ and on-shore PAQ. The conditions include two options for both Peru and Chile and the following are the minimum number of days required in quarantine for camelids from:

1. Peru

- . 30 days PEQ and 60 days OSQ or
- . 90 days PEQ and 30 days PAQ.

2. Chile

- . 30 days PEQ and 40 days OSQ or
- . 70 days PEQ and 30 days PAQ.

These **minimum** periods of quarantine allow sufficient time for the required testing, treatments, transport and for the incubation periods of diseases acquired immediately prior to the start of the quarantine period.

Determinant periods are for:

- . JD radiometric faecal culture – 70 days
- . longest period of time between infection and clinical expression of viral diseases of concern – 30 days
- . time taken for seeds to pass through the gut of camelids – 14 days
- . time taken to complete testing – 30 days
- . BT viraemic period in cattle – 60 days (probably much shorter in camelids).

The length of the quarantine periods have been determined to meet the following requirements:

- . the receipt of JD faecal culture results before the animals enter Australia
- . three maximum incubation periods of 30 days before entering Australia from Peru (affected by FMD), and two maximum incubation periods of 30 days before entering Australia from Chile.

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