

AUSTRALIAN VETERINARY EMERGENCY PLAN

# AUSVETPLAN

1996

## Disease Strategy

### Peste des petits ruminants

AUSVETPLAN is a series of technical response plans that describe the proposed Australian approach to an exotic animal disease incursion. The documents provide guidance based on sound analysis, linking policy, strategies, implementation, coordination and emergency-management plans.

**Agriculture and Resource Management Council of Australia and New Zealand**

**This Disease Strategy forms part of:**

**AUSVETPLAN Edition 2.0, 1996**

[AUSVETPLAN Edition 1.0, was published in 1991]

**This strategy will be reviewed regularly. Suggestions and recommendations for amendments should be forwarded to the AUSVETPLAN Coordinator (see Preface).**

**Record of amendments to this manual:**

There are occasional minor differences in the page breaks between the paper and this electronic version which we can unfortunately not avoid.

© Commonwealth of Australia and each of its States and Territories 1996  
ISBN 0 642 24506 1

This work is copyright and apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced without the written permission from the publisher, the Department of Primary Industries and Energy, acting on behalf of the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ). Requests and inquiries concerning reproduction and rights should be addressed to the AUSVETPLAN Coordinator.

The Commonwealth/States/Territories gives no warranty that the information contained in *AUSVETPLAN* is correct or complete. The Commonwealth shall not be liable for any loss howsoever caused whether due to negligence or other arising from use or reliance on this code.



## PREFACE

This **Disease Strategy** for the control and eradication of **peste des petits ruminants** (PPR) is an integral part of the **Australian Veterinary Emergency Plan**, or AUSVETPLAN (Edition 2.0). AUSVETPLAN structures and functions are described in the **Summary Document**.

This strategy sets out the disease control principles that were approved by the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) out-of-session in January 1996, for use in an animal health emergency caused by the introduction of PPR into Australia.

PPR is designated as a List A disease by the Office International des Epizooties (OIE). List A diseases are, 'Communicable diseases which have the potential for serious and rapid spread, irrespective of national borders; which are of serious socioeconomic or public health importance and which are of major importance in the international trade of animals and animal products'. The principles contained in this document for the diagnosis and management of an outbreak of PPR conform with the **OIE International Animal Health Code 1992** (OIE Code; see Appendix 3).

PPR is not included in the Commonwealth/States cost-sharing agreement for the eradication of certain exotic animal diseases.

Detailed instructions for field implementation of the strategies are contained in the AUSVETPLAN **Operational Procedures Manuals** and **Management Manuals**. Cross-references to strategies, manuals and other AUSVETPLAN documents are expressed in the form:

Document Name, Section no.

For example, **Decontamination Manual, Section 3**.

In addition, *Exotic Diseases of Animals: A Field Guide for Australian Veterinarians* by W.A. Geering, A.J. Forman and M.J. Nunn, Australian Government Publishing Service, Canberra, 1995 (**Exotic Diseases Field Guide**) is a source for some of the information about the aetiology, diagnosis and epidemiology of the disease and should be read in conjunction with this strategy.

This strategy will be reviewed regularly. Suggestions and recommendations for amendments should be forwarded to:

The AUSVETPLAN Coordinator  
Animal Diseases/Incidents Section  
Livestock and Pastoral Division  
Department of Primary Industries and Energy  
GPO Box 858  
Canberra ACT 2601  
Tel: (06) 272 5540; Fax: (06) 272 3372

## **Membership of writing group**

Graham Gregory (convenor)

Department of Primary Industry and  
Fisheries, TAS

Ian Douglas

Department of Primary Industries, QLD

Bill Geering

Department of Primary Industries and  
Energy (Cwlth), ACT

Peter Hooper

Australian Animal Health Laboratory, VIC

*The writing group was responsible for drafting this strategy. However, the text may have been amended at various stages of the consultation/approval process and the policies expressed in this version do not necessarily represent the views of all members of the writing group. Contributions may also have been made by other people not listed above and the assistance of all involved is gratefully acknowledged.*

# CONTENTS

<b>PREFACE</b> .....	<b>iii</b>
<b>Membership of writing group</b> .....	<b>iv</b>
<b>1 NATURE OF THE DISEASE</b> .....	<b>1</b>
1.1 Aetiology.....	1
1.2 Susceptible species.....	1
1.3 World distribution and occurrence in Australia .....	2
1.4 Diagnostic criteria .....	2
1.4.1 Clinical signs .....	2
Goats.....	2
Sheep .....	3
1.4.2 Pathology.....	3
Gross lesions.....	3
Microscopic lesions (histopathology).....	3
1.4.3 Laboratory tests .....	3
Specimens required.....	3
Transport of specimens.....	4
Laboratory diagnosis .....	4
1.4.4 Differential diagnosis.....	4
1.5 Resistance and immunity .....	4
1.5.1 Innate and passive immunity .....	5
1.5.2 Active immunity .....	5
1.5.3 Vaccination.....	5
1.6 Epidemiology .....	5
1.6.1 Incubation period.....	5
1.6.2 Persistence of virus.....	5
General properties/environment.....	5
Live animals.....	6
Animal products and by-products.....	6
1.6.3 Modes of transmission.....	6
Live animals.....	6
Artificial breeding.....	6
Animal products.....	6
Fomites .....	6
Vectors.....	6
1.7 Manner and risk of introduction.....	6
<b>2 PRINCIPLES OF CONTROL AND ERADICATION</b> .....	<b>7</b>
2.1 Introduction.....	7
2.2 Methods to prevent spread and eliminate pathogens.....	7
2.2.1 Quarantine and movement controls .....	7
Zoning.....	8
2.2.2 Tracing.....	8
2.2.3 Surveillance .....	8
2.2.4 Treatment of infected animals .....	8

2.2.5	Destruction of animals .....	8
2.2.6	Treatment of products and by-products .....	9
2.2.7	Disposal .....	9
2.2.8	Decontamination.....	9
2.2.9	Vaccination.....	10
2.2.10	Wild animal control .....	10
2.2.11	Vector control .....	10
2.2.12	Sentinel and restocking measures.....	10
2.2.13	Public awareness .....	10
2.3	Feasibility of control in Australia.....	10
<b>3</b>	<b>POLICY AND RATIONALE.....</b>	<b>11</b>
3.1	Overall policy for peste des petits ruminants .....	11
3.2	Strategy for control and eradication .....	12
3.2.1	Stamping out.....	12
3.2.2	Quarantine and movement controls .....	12
	Zoning.....	13
3.2.3	Treatment of infected animals .....	13
3.2.4	Treatment of animal products and by-products .....	13
3.2.5	Vaccination.....	13
3.2.6	Tracing and surveillance.....	13
3.2.7	Wild animal control .....	13
3.2.8	Decontamination.....	14
3.3	Social and economic effects.....	14
3.3.1	Social effects .....	14
3.4	Criteria for proof of freedom.....	14
3.5	Funding and compensation .....	15
3.6	Strategies if the disease becomes established.....	15
<b>APPENDIX 1</b>	<b>Guidelines for classifying declared areas.....</b>	<b>16</b>
<b>APPENDIX 2</b>	<b>Recommended quarantine and movement controls .....</b>	<b>17</b>
<b>APPENDIX 3</b>	<b>OIE International Animal Health Code .....</b>	<b>19</b>
<b>APPENDIX 4</b>	<b>Procedures for surveillance and proof of freedom .....</b>	<b>24</b>
<b>GLOSSARY .....</b>		<b>25</b>
	Abbreviations .....	27
<b>REFERENCES.....</b>		<b>28</b>
	Further reading .....	28
	Video/training resources.....	29
	OIE publications.....	29
<b>INDEX .....</b>		<b>30</b>





# 1 NATURE OF THE DISEASE

Peste des petits ruminants (PPR) (also known as goat plague) is a disease of goats and sheep characterised by fever, necrotic inflammation of the mouth lining, enteritis, high morbidity and high mortality. The disease spreads rapidly amongst in-contact animals. The disease is very similar to rinderpest, which is caused by a closely-related virus.

## 1.1 Aetiology

The PPR virus is a member of the genus *Morbillivirus* of the family Paramyxoviridae. Viruses in the same genus are causative agents of canine distemper, phocine (seal) distemper, human measles, rinderpest and equine Morbillivirus disease. The PPR virus is believed to have evolved from the rinderpest virus, but is now recognised as a distinct virus.

All isolates are serologically the same, although there is variation in virulence in the field.

## 1.2 Susceptible species

### *Goats and sheep*

- Goats and sheep are the only natural hosts for PPR. Goats appear to be more susceptible and suffer a more severe clinical disease than sheep.
- Sheep are relatively resistant to PPR. In some cases sheep living in close proximity to infected goats have remained unaffected.
- Goat breeds in Africa as well as individual animals vary in susceptibility to PPR, with the guinean breeds being more susceptible than sahelian breeds (Lefevre and Diallo 1990). European breeds are readily susceptible. Age is also important, with animals aged from 3–18 months being more severely affected than adults or unweaned young.
- If infection occurs in Australia, both sheep and goats will probably be severely affected. However, it is possible that clinical signs may be less obvious in either species. This is unpredictable.

### *Cattle*

- Subclinical infection has been reported in cattle after experimental inoculation and by contact, with subsequent antibody production.

### *Deer*

- Red deer, *Cervus elaphus*, have been infected in a natural outbreak.
- White-tailed deer, *Odocoileus virginianus*, are susceptible to experimental infection and may develop lesions similar to those seen in sheep and goats.
- Some deer may become subclinically infected with virus and show no visible signs (Hamby and Dardiri 1976).

### *Pigs*

- Pigs can be subclinically infected with PPR but they do not transmit the virus. They are not considered to be important in the epidemiology of PPR (Nawathe and Taylor 1979).

### *Wild species*

- Although PPR has been observed in some species of gazelle, ibex, and wild species of sheep, the role of wild animals in the epidemiology of PPR does not seem to be very important.

## **1.3 World distribution and occurrence in Australia**

PPR is endemic in the sub-Saharan region of Africa, extending to the Arabian Peninsula. It was detected in India in 1989.

It has never been recorded in Australia.

## **1.4 Diagnostic criteria**

PPR should be suspected when goats or sheep are affected with an acute febrile diarrhoea accompanied by erosions of the mouth lining and high morbidity and mortality. If rapid spread from animal to animal is occurring, and animals of all ages are sick and dying, then the picture is highly suggestive of PPR.

### **1.4.1 Clinical signs**

[For terms not defined in the text see Glossary]

#### **Goats**

- A sudden onset of fever develops, peaking on the second or third day at 40–42°C, before slowly returning to normal. The fever lasts 3–8 days. Deaths usually occur during the later stages of the fever.
- With the onset of fever, the animals suffer loss of appetite and become severely depressed. An early watery nasal discharge develops and may become profusely catarrhal containing mucus and pus, leading to encrustation, blocking of the nostrils and respiratory distress. The nasal lining may become necrotic. Conjunctivitis with discharge from the eyes causes matting of the eyelids.
- The mouth lining is slightly engorged with necrotic mouth lesions appearing within a few hours of the onset of fever (Scott 1981), although Dardiri et al (1976) reported 3–4 days between fever and the appearance of erosions. Small areas of necrosis usually first appear on the lining of the lower gums, but in severe cases spread rapidly to the dental pad, hard palate, cheeks and buccal papillae and tongue (including the anteriodorsal area). The necrotic tissue sloughs leaving irregular shallow erosions and remnant tags of necrotic epithelium. In some animals the mouth lesions may be mild and heal within 48 hours. Such animals are likely to recover.
- Most animals develop severe diarrhoea or dysentery about 2–3 days after the development of mouth lesions, resulting in rapid dehydration and loss of weight. Secondary bacterial infections are common. Pregnant animals may abort.

- The morbidity rate in susceptible animals is usually 60–90%, with case mortality rate 55–90%.
- Peracute cases may be seen in goats with fever and sudden death and no other signs. At postmortem the only signs may be congestion of the ileocaecal valve and bronchopneumonia.
- A subclinical or inapparent form is common in some regions due to the innate resistance of local breeds. The disease lasts 10–15 days with variable signs, but often including respiratory distress.

### **Sheep**

- The clinical signs in sheep are the same as in goats but generally less severe. The disease may be present in goats without affecting sheep.

## **1.4.2 Pathology**

### **Gross lesions**

Postmortem findings in acute cases include a dehydrated carcass with faecal soiling, necrotic lesions in the mouth and nose, congestion of the ileocaecal valve, linear engorgement and blackening of folds of the caecum, proximal colon and rectum (zebra striping), enlarged spleen and oedema of lymph nodes, especially the mesenteric lymph nodes. Primary bronchopneumonia is a common finding that is specific for the virus and important diagnostically (Brown et al 1991).

### **Microscopic lesions (histopathology)**

Distinct changes similar to many morbillivirus infections are seen histologically, including multinucleated giant cells, especially in the lungs, and eosinophilic intranuclear and/or intracytoplasmic inclusion bodies.

## **1.4.3 Laboratory tests**

Animal specimens should initially be sent to the State or Territory diagnostic laboratory from where they will be forwarded to the Australian Animal Health Laboratory (AAHL), Geelong for exotic disease testing after obtaining the necessary clearance from the chief veterinary officer (CVO) of the State or Territory of the disease outbreak and informing the CVO of Victoria (for transport of the specimens to Geelong).

### **Specimens required**

Virus can be isolated during the acute stage of the disease when clinical signs are still apparent. Virus is present for approximately 10 days after the onset of fever. Swabs of the eye (conjunctival sac), nasal secretions, and mouth and rectal linings, as well as clotted and whole blood (with EDTA anticoagulant), should be submitted. Lymph node or spleen biopsies should also be considered. Specimens for virus isolation are best taken from animals with a high temperature and before diarrhoea has started (look for the early less obvious cases).

At postmortem fresh samples of spleen, lymph nodes and affected sections of alimentary tract mucosa should be collected for virus isolation. Samples of tonsil, tongue, spleen, lung, lymph nodes, and affected parts of the alimentary tract should be collected for histopathology. Postmortem samples should be collected only from animals slaughtered for the purpose or very fresh carcasses.

### Transport of specimens

Unpreserved tissue, blood and swab specimens should be chilled and forwarded with water ice or frozen gel packs. If delays of more than 72 hours are anticipated then specimens should be frozen and forwarded packed in dry ice. For further information see the **Laboratory Preparedness Manual, Section 6 and Appendix 3**.

### Laboratory diagnosis

*AAHL tests.* Tests available at AAHL for the laboratory confirmation of diagnosis of PPR are shown in Table 1 and include virus isolation, histopathology of affected oral mucosa, intestines and lungs and electron microscopy. Animal transmission tests can also be used to demonstrate the presence of the virus but a diagnosis would not be available for more than a week.

*Other tests.* Tests developed overseas but not currently used in Australia include a immunocapture enzyme-linked immunosorbent assay (ELISA) test specific for PPR antigen. Rinderpest and PPR antibodies can be distinguished by either cross virus serum neutralisation tests, the competitive ELISA using monoclonal antibodies (Anderson et al 1991), or differential immunohistochemical staining. However it is unlikely that both diseases would occur in Australia at the same time.

**Table 1 Diagnostic tests currently available at AAHL for PPR**

Test	Specimen required	Test detects	Time taken to obtain result
Virus isolation	tissue/whole EDTA blood	virus	5–7 days
Histopathology	tissue samples	microscopic changes	2 days
Electron microscopy	tissue samples	virus	1 day
Animal inoculation tests	virus isolate	host range	10 days

Source: Information provided by AAHL, 1995 [refer to AAHL for the most up-to-date-information].

#### 1.4.4 Differential diagnosis

The following diseases must be considered in the differential diagnosis of PPR:

- rinderpest
- bluetongue
- foot-and-mouth disease
- other exanthematous conditions (ie involving eruptions on the surface of the body)

Many reports in the literature of rinderpest in small ruminants are now thought to be descriptions of PPR. The occurrence of clinical rinderpest in sheep or goats is unclear, although they are likely to be infected subclinically and seroconvert.

## 1.5 Resistance and immunity

Susceptible sheep and goats of all ages and breeds can be infected with PPR virus and develop the acute disease. In countries free from the disease the introduction of PPR into the totally susceptible population is likely to produce high morbidity and mortality and spread rapidly, but there is always the possibility of mild disease.

### 1.5.1 Innate and passive immunity

Breeds of goats show varying degrees of resistance to infection with PPR (see Section 1.2). Maternal immunity provides protection for 3–4 months.

### 1.5.2 Active immunity

Infection with PPR provides life-long immunity in recovered animals.

### 1.5.3 Vaccination

An attenuated cell culture-adapted rinderpest virus vaccine (RBOK) will provide protection against PPR infection for at least four years.

This protection relies on the cross protection between the viruses and appears to be a cell mediated response. Use of rinderpest vaccine will effect serological surveys for the presence of rinderpest. It will not, however, interfere with later serological surveys for PPR.

An homologous attenuated PPR virus vaccine is produced at the Institut d'Élevage et Médecine Vétérinaire (IEMVT) in France, and this gives lifelong immunity against virulent virus in goats. The use of this vaccine is unlikely to be warranted in Australia.

See the disease strategy for **Rinderpest, Appendix 5** for further details and precautions on the use of rinderpest virus vaccine.

## 1.6 Epidemiology

Our knowledge of the epidemiology of PPR is fragmentary but some conclusions have been compiled from the information available for rinderpest.

### 1.6.1 Incubation period

The incubation period is usually 3–5 days. The maximum incubation period under the OIE Code is 21 days (see Appendix 3).

### 1.6.2 Persistence of virus

#### General properties/environment

Information for the PPR virus is not available but it is assumed that the survival, characteristics (eg pH, temperature) are similar to those for rinderpest virus as follows:

- a half life of 5 minutes in cattle blood, spleen or lymph node at 56°C;
- survival in culture for at least 4 months at –20°C, 8 weeks at 4°C, 1 week at 20–25°C and >2.6 days at 37°C;
- rapidly inactivated at temperatures above 70°C (but there is no confirmation that rinderpest virus is destroyed by pasteurisation in milk);
- at 4°C the virus is most stable at a pH of 7.2–7.9, with a half life of 3.7 days and is inactivated at pH values less than 5.6 or greater than 9.6 (Geering et al 1995);
- rapidly inactivated by ultraviolet light and desiccation within 4 days.

PPR virus is sensitive to a wide range of disinfectants due to its large size, lipid-containing virus envelope and sensitivity to both acid and alkali conditions (see Section 2.2.8).

**Live animals**

Virus is present in all secretions and excretions from infected animals for approximately 10 days after the onset of fever. Animals that have been infected with PPR either die or acquire firm immunity. There is no chronic carrier state.

**Animal products and by-products**

Information is not available on PPR virus but it is assumed that, like rinderpest virus, it would be rapidly inactivated by the putrefaction in the carcase of an animal dying from PPR or by a pH of 5.5 in hung meat. The rinderpest virus is reported to remain infectious in salted or frozen meat for several months and may also persist for some time in refrigerated meat (NZMAF 1991a, b). In the case of PPR such persistence would not be important in spreading the disease, because the cycle back to sheep or goats is unlikely to be completed, and pigs are not susceptible to infection.

For rinderpest the virus can be present in milk from 1–2 days before clinical signs develop and for as long as 45 days after recovery. It is therefore likely that goat or sheep milk would be similarly infected with PPR virus.

**1.6.3 Modes of transmission****Live animals**

Infection spreads to new areas by the movement of infected animals. Transmission is usually by direct contact. Most infection is through short-range aerosol from sneezing and coughing. Infection is primarily acquired via the respiratory system.

Infected animals shed virus in expired air, and in all secretions and excretions (including semen, milk and urine) at the onset of the fever and in the faeces at the onset of diarrhoea. At night under cool conditions infection can be spread over a distance of about 10 metres.

**Artificial breeding**

The virus is present in semen and embryos and likely to be transmitted in this way (see the **Artificial Breeding Centres Enterprise Manual**).

**Animal products**

PPR virus is present in the milk from infected animals. Feeding this milk to kids or lambs can therefore spread the infection.

**Fomites**

The virus survives poorly outside the host, which makes indirect transmission of virus unlikely, either by animate or inanimate vectors.

**Vectors**

It is not considered that insects can spread PPR.

**1.7 Manner and risk of introduction**

As the virus survives poorly outside the host the most likely way of introduction is by the importation of infected sheep or goats. The importation of small ruminants from endemic countries is not permitted, so the risk of introduction is remote.

It is unlikely that the virus would survive in sheep-transport ships returning from the Middle East.

## **2 PRINCIPLES OF CONTROL AND ERADICATION**

### **2.1 Introduction**

PPR can be readily controlled and eradicated by application of strict quarantine procedures on infected and neighbouring premises and the destruction and disposal of infected and in-contact animals. The characteristics of PPR that would assist eradication are:

- rapid spread with a high mortality rate so the disease should become apparent soon after introduction in a closely-settled area;
- acute cases are easily diagnosed clinically;
- the disease is confined to goats and sheep;
- a short incubation period;
- virus does not survive long in the environment;
- minimal indirect transmission of the virus;
- recovered animals are solidly immune;.
- no carrier state; and
- infected or exposed animals can be diagnosed serologically.

Characteristics that may make PPR difficult to eradicate are:

- the possibility of undetected disease in areas where stock populations are sparse; and
- the disease may establish in the feral goat population.

### **2.2 Methods to prevent spread and eliminate pathogens**

#### **2.2.1 Quarantine and movement controls**

PPR is usually spread by direct animal contact. The creation of a standstill zone around all infected premises (IPs) to prevent the movement of susceptible and in-contact animals should be effective in preventing the spread of the disease. It is important to apply quarantine measures as early as possible to slow the rate of spread in an area (see Appendixes 1 and 2).

IPs and dangerous contact premises (DCPs) will be quarantined to prevent spread of the disease by prohibiting movement of susceptible animals, products and materials from the premises.

As the virus survives for only a few days outside the host, in many cases it will usually be sufficient to declare only part of a property as the IP or DCP. In this way not all animals on a property may need to be destroyed. Care must be taken to examine management practices when deciding which mobs may have been exposed to infection, and to ensure that premises such as stockyards and shearing facilities are not used by remaining animals on the property until they can be thoroughly cleaned and disinfected or ‘spelled’.

Further movement controls will be established through a restricted area (RA) and a control area (CA) surrounding the IP. All susceptible animal movements will be prohibited in the RA and will be severely restricted in the CA.

No movement will be permitted from an IP of personnel, vehicles and equipment (unless they undergo cleaning and disinfection) until 4 days after the last animal is destroyed. Ruminants or pigs may be sent for immediate slaughter after the disease is controlled and

it has been demonstrated that transmission has ceased on the IP. They must go direct to an abattoir in the RA or CA. They must not be held in the lairage any longer than the minimum time required for meat hygiene purposes (24 hours maximum).

### **Zoning**

Once the extent of the outbreak has been defined, consideration should be given to declaring a major part of Australia free from the disease. The free area should be based on geographic boundaries but should not include any premises within 11 km of any IP, or as determined by international clients.

#### **2.2.2 Tracing**

Detailed tracing of all movements of animals, animal products and feedstuff to and from the IP or DCP needs to be urgently carried out. As a minimum, trace-back should apply to all movements during the period from 21 days before the first case was seen on the IP.

Items that should be traced include all sheep and goats, the vehicles that transported them, goat or sheep milk, and any people who had close contact with infected flocks.

#### **2.2.3 Surveillance**

It is important to institute an aggressive surveillance scheme to detect all infected flocks as soon as possible. Surveillance will be concentrated upon properties considered to be at risk because of recent movement of animals and people from IPs, as well as those in close proximity to IPs (see Appendix 4 for details).

Broad surveillance must be maintained. Personnel such as farmers, veterinarians, stock agents and abattoir workers must all be requested to watch for signs of disease and to promptly report suspicion of infection.

#### **2.2.4 Treatment of infected animals**

There is no effective treatment for PPR, however systematic treatment is used in endemic countries to aid recovery in infected animals. This would be counterproductive to an eradication program in Australia.

#### **2.2.5 Destruction of animals**

As soon as practical after the diagnosis of PPR and stock have been valued, all infected flocks of sheep and goats on the IP will be humanely slaughtered. Animals from a DCP or SP that are not viraemic, ie do not show signs and have a normal temperature, may be slaughtered for human consumption, provided they can be moved securely to an abattoir.

A decision to slaughter other non-infected goats and sheep on the IP should not be made hastily. The following factors should be considered in determining the risk of infection being present in other mobs of sheep or goats:

- results of transmission experiments at AAHL;
- the degree of contact with infected animals;
- the disease will die out anyway if the mob is isolated from other animals;
- the likely compensation bill; and
- resources available.

As a general rule, only the infected mob of sheep or goats should be destroyed, unless evidence of spread in other animals is obtained clinically or from serological tests. Provided recommended sanitary measures are taken, the disease will not spread from an



isolated group of sheep or goats. For more detail see the **Destruction of Animals Manual, Sections 4.2 and 4.3.**

### **2.2.6 Treatment of products and by-products**

Salted or frozen meat is unlikely to be important in transmission of disease (see Section 1.6.2).

Milk and milk products that have left the IP during the 4 days before the first case must be traced and suitably heat treated. Although the virus is rapidly inactivated at temperatures above 70°C, there is no confirmation that it is destroyed in milk by pasteurisation (see Section 1.6.2). Heat drying of milk for inclusion in milk powder should inactivate the virus.

Although it is unlikely that any virus on wool or fibre would remain infective and spread disease wool bales should be sprayed twice with sodium hydroxide prior to removal to wool stores. Skins, wool, fibre deemed to be infected may also need to be destroyed.

### **2.2.7 Disposal**

Carcases will be either buried or burned or allowed to decompose as long as they are protected from scavengers such as dogs or feral pigs. Feedstuff and bedding and any wool, skins or fibre that may have been contaminated may also be buried or burned.

The urgency for burial is not as great as for a highly infectious disease such as foot-and-mouth disease but care should be taken to ensure proper disposal. For more detail see the **Disposal Procedures Manual.**

### **2.2.8 Decontamination**

Although the exact survival is not known it is assumed to be similar to rinderpest virus where the maximum survival time in the environment is 4 days. While a program of property decontamination may seem excessive on epidemiological grounds, it may be justified on the basis of assuring freedom from infection. A policy for decontamination should consist of general cleaning of goat and sheep sheds and yards. Vehicles used for the transportation of at risk animals must be cleaned and disinfected. Faeces and other wastes removed at cleaning should be buried.

As an added precaution, fomites such as bedding materials, feedstuff, footwear, clothing and stock handling equipment should be appropriately cleaned and disinfected or destroyed if they are considered to be heavily contaminated and there is a risk of transmission. People who have close contact with infected animals or other material must be adequately decontaminated prior to leaving the IP.

The virus is susceptible to many disinfectants and to high and low pH (see Section 1.6.2). In general, the alkalis (sodium carbonate, sodium hydroxide), the halogens (chloride) and phenolic compounds are good for the disinfection of buildings, wooden structures, concrete surfaces, equipment and vehicles. For personal disinfection, citric acid, alcohols and iodophors are suitable. Further information, including dilution rates and trade names are available in the **Decontamination Manual, Tables 2.10, 3.14 and 4.**

It should not be necessary to destroy any buildings or materials as the virus only survives for a few days in the environment (see Section 1.6.2).

### 2.2.9 Vaccination

Animals would not be vaccinated unless a stamping-out policy was not feasible. This is unlikely unless the disease spreads to the feral goat population, in which the eradication of the disease may be difficult.

A ring vaccination program may then be introduced to provide a vaccinated barrier between infected animals or feral goats and clean stock. The vaccine will give about 4 years protection, during which time the feral goat population and animals in the infected area would be controlled.

### 2.2.10 Wild animal control

The large feral goat population in Australia represents a potential problem for the control of PPR. If a feral goat population exists in the area of a disease outbreak a surveillance and a surveillance and control program will be required. As the eradication of feral goats is unlikely to be achievable, the formation of a buffer area around the goat population, either by depopulating the area of goats and sheep or by ring vaccination, would be required to contain the disease. It is unlikely that wild deer will become infected or play any part in the spread of PPR. However, as PPR has occurred in deer overseas (see Section 1.2), some clinical or serological surveillance of any deer in the area should, be undertaken. If signs are found, wild deer must be controlled in the immediate area.

For more details on goat control see the **Wild Animal Control Manual, in press**.

### 2.2.11 Vector control

Vectors do not play any role in the transmission of PPR.

### 2.2.12 Sentinel and restocking measures

As the PPR virus does not survive for more than 4 days in the environment, the use of specific sentinel animals is not warranted. If the premises have been destocked, restocking should be permitted after a nominal period, say 30 days. If some susceptible animals are allowed to remain on the premises, they should be tested for antibodies. Restocking may be permitted only if no evidence of infection is detected.

For 2 months after repopulation a property will remain in quarantine, with stock movement allowed only for direct slaughter. During this period a sample of animals will be inspected every 2 weeks for the appearance of clinical signs or positive serology.

New stock introduced to an IP may be subject to compensation in the case of a breakdown, so care must be taken to ensure proper decontamination.

### 2.2.13 Public awareness

A media campaign must emphasise the importance of inspecting sheep and goats regularly and of reporting suspicious lesions and unusual deaths promptly. The public must not be panicked into avoiding sheep and goat products.

The campaign should give facts on the disease, control measures, movement restrictions and safety of products. For further information see the **Public Relations Manual**.

## 2.3 Feasibility of control in Australia

It is likely that PPR could be eradicated quickly in Australia (see Section 2.1).

### 3 POLICY AND RATIONALE

#### 3.1 Overall policy for peste des petits ruminants

Peste des petits ruminants (PPR) is an OIE List A disease that has the potential for rapid spread and serious production loss and deaths within flocks, and which is important in the trade in sheep, goats and their products.

The policy is to eradicate PPR in the shortest possible period, while limiting economic impact, using a combination of strategies including:

- ☞ *stamping out*, which involves quarantine, slaughter of all infected and exposed susceptible animals and sanitary disposal of destroyed animals and contaminated animal products, to remove the source of infection;
- ☞ *quarantine and movement controls* on animals, animal products and things in declared areas to prevent spread of infection;
- ☞ *decontamination* of facilities, products and things to eliminate the virus on infected premises and to prevent spread in declared areas;
- ☞ *tracing and surveillance* to determine the source and extent of infection and to provide proof of freedom from the disease;
- ☞ *zoning* to define infected and disease-free areas; and
- ☞ *an awareness campaign* to facilitate cooperation from industry and the community;

Rinderpest vaccines have been used overseas to protect animals against PPR. It is extremely unlikely that vaccine would be used in Australia.

PPR spreads rapidly within herds if animals are in close contact and will result in high mortality on infected properties. The disease is unlikely to move between farms, however, if the above procedures are quickly implemented.

An uncontrolled outbreak of PPR would cause severe production losses with consequent dislocation and financial losses in the sheep and goat industries and associated service and sales industries.

PPR is not included in the Commonwealth/States cost-sharing agreement.

The CVO(s) in the State(s)/Territory(s) in which the outbreak(s) occurs will be responsible for implementing disease control measures (in accordance with relevant legislation), and will make ongoing decisions on follow-up disease control measures in consultation with the Consultative Committee on Exotic Animal Diseases (CCEAD), the State/Territory and Commonwealth governments, and representatives of the affected industries. The detailed control measures adopted will be determined using the principles of control and eradication (Section 2) and epidemiological information about the outbreak. For further information on the responsibilities of the State/Territory disease control headquarters and local disease control centre(s), see the **Control Centres Management Manual, Part 1, Sections 3 and 4**.

## **3.2 Strategy for control and eradication**

The strategy is to eradicate the disease in the shortest possible time using stamping out and strict quarantine and movement controls on IPs and DCPs as the main strategies. The disease is unlikely to rapidly spread between farms if animals are prevented from moving, as introduction of the disease is almost entirely dependent on contact with an infected animal. Tracing and surveillance to determine the extent of the infection and to define the free area is important and, as the disease could be transferred to feral goats, these need to be included in any survey.

Public awareness and liaison with industry, the media and the public are key strategies.

### **3.2.1 Stamping out**

All sheep and goats on an IP will be slaughtered and disposed of on the premises. Action on properties to which dangerous contacts have been traced will depend on circumstances. If a DCP contains relatively few susceptible animals in addition to the dangerous contact animals, all will be slaughtered. If, on the other hand, there is a large number of stock involved with distinct separation of groups, then only the dangerous contact animals need to be slaughtered and the in-contacts quarantined and observed for any transmission that may have occurred. It may be possible to apply the same conditions to animals on an IP that are completely separated, have had no contact with the infected animals and are not showing any signs of disease. Such action would reduce compensation and operational costs or losses by the producer.

### **3.2.2 Quarantine and movement controls**

Strict quarantine and movement control of animals, people and things will be used to prevent the spread of disease from the most dangerous to other premises. This will involve the declaration of IPs, DCPs and SPs and the establishment of an RA and a CA to ensure that the disease and disease-free areas are well defined for domestic and international recognition and the continuation of trade. The RA must include any feral goat herds that are implicated in the disease.

The movement of animals into and out of IPs and DCPs will be completely prohibited but some products may be allowed to be moved under permit and after treatment. Quarantine and movement controls will also be imposed on SPs for at least 30 days with the movement of certain products allowed only under permit.

Movement controls on animals and products from the RA and CA will be strict while the disease is still believed to be spreading but will ease once the infection is contained and under control.

See Appendix 1 for further details.

### **Zoning**

The major part of Australia could be declared a disease-free zone for both domestic and international trade purposes after the extent of initial spread has been defined by technically-sound and scientifically-based surveillance.

### **3.2.3 Treatment of infected animals**

Treatment of infected or other susceptible animals would be counterproductive.

### **3.2.4 Treatment of animal products and by-products**

Certain products from the RA will be permitted to be moved if they are treated beforehand. Milk and milk products from IPs will be destroyed and buried if possible. Milk from other premises in the RA may be treated before sale. Skins and fibre will be treated in most cases by spraying with a suitable disinfectant. Other products may be subject to treatment depending on the stage of infection on different properties.

Sheep and goats may be permitted movement direct to slaughter after a safe period.

### **3.2.5 Vaccination**

If a disease outbreak outstrips the resources available to control it by slaughter, an attenuated cell culture rinderpest vaccine could be used for a ring vaccination program to provide a buffer zone of immune animals around the disease area until the outbreak can be brought under control. The vaccine is safe and provides long immunity so that revaccination will not be necessary.

Use of rinderpest vaccine will affect future serological surveys for the presence of rinderpest or PPR, so all vaccinated animals must be identified and later slaughtered.

If the disease becomes more widespread than anticipated, it may be necessary to use vaccine more extensively to assist with the continuing stamping-out strategy.

### **3.2.6 Tracing and surveillance**

Tracing and surveillance will be used to determine the distribution of the disease and the disease-free areas. Feral goats, if present, must be included in the survey.

Trace-back should include all movements of sheep and goats, their products, people and things onto the premises over the period of 21 days before the first case.

Trace-forward is to include all movements off the IP since 30 days before the first case.

### **3.2.7 Wild animal control**

As sheep and goats are the only susceptible animals, the only wild animals that need to be considered are feral goats. These will need to be surveyed if they are present in the vicinity of the IP(s) and have contact with domestic sheep and goats. If found to be positive, control measures such as vaccination or slaughter will be implemented.

### 3.2.8 Decontamination

Vehicles that carry infected or suspect animals, and people leaving the IP must be decontaminated. While it is recognised that the PPR virus does not survive outside of the animal for more than a few days, it is necessary to decontaminate equipment, buildings, pens and other areas and things with which the infected or suspect animals may have been in contact. Where possible, manure should be collected, disinfected and buried, as should any other fomites that may have become contaminated. Paddocks that cannot be disinfected should be 'spelled' for at least 30 days.

## 3.3 Social and economic effects

### 3.3.1 Social effects

An outbreak of PPR in Australia would be expected to cause high mortality on the IPs. The implementation of a slaughter-out policy may not lead to the loss of many more stock on IPs than from the disease itself. There is no national agreement to pay compensation for stock destroyed and affected properties will suffer large financial losses.

An uncontrolled outbreak of PPR would cause serious stock and financial losses in the goat and sheep industries and local communities. Job losses both on farm and in support industries could follow.

If PPR became endemic, there would be continuing costs and losses due to animal mortalities, stamping out and the cost of preventative vaccination. Movement restrictions on livestock and products within the RA and CA will cause loss of market opportunities and associated financial losses to non-affected properties in the area and also to support industries such as the stock transport industry. Some industries not directly affected by PPR, such as the cattle industry, may also be affected by movement restrictions.

An outbreak of PPR will affect both local and export markets. Australia would lose its export market of live sheep and goats and their products at least in the short term until disease free zones have been well defined. If the disease spreads then greater losses will be involved. Not all products may be prohibited by our trading partners.

The value of exports to the Australian sheep industry (ABARE 1993) is approximately \$3837 million. This is made up of:

wool	\$3223 million
mutton	\$260 million
lamb	\$137 million
skins	\$110 million
live sheep	\$107 million

## 3.4 Criteria for proof of freedom

Under the OIE Code (see Appendix 3) Australia would be considered free from PPR six months after the occurrence of the last case if a stamping-out policy is practised with or without vaccination. In order to demonstrate that the disease has been successfully contained and eradicated, it is essential that we embark on a systematic and accurate disease surveillance program during that six months (see Appendix 4 for details).

Farmers, veterinarians and meat workers must be alert and report suspicion of disease and these must be rigorously followed up. Dead animals from repopulated properties must be autopsied and appropriate samples taken for virus testing.

Any animals vaccinated would have to be permanently identified and slaughtered commercially where possible. This is necessary as the presence of vaccinal antibodies could mask evidence of transmission or a subsequent outbreak.

A sentinel restocking program is unnecessary as the virus will only survive for a short period in the environment. Complete restocking of the premises may occur 30 days after the depopulation has occurred and decontamination has been completed. The repopulated animals must be inspected at least every two weeks and the premises will remain in quarantine for a period of two months. Any animals that were not slaughtered on the IP because of their isolation from infected animals must be subjected to serological testing with negative result before restocking can take place.

### **3.5 Funding and compensation**

As PPR is not included in the Commonwealth/States cost-sharing agreement for the eradication of certain exotic animal diseases, funds to pay the costs of eradication, including compensation, will have to be found from other sources. Possible sources are:

- State government funds;
- State disease compensation funds;
- Commonwealth government funds; and
- special industry levies;
- other agreed arrangements.

Alternatively, the costs and losses might have to be borne by individual owners.

### **3.6 Strategies if the disease becomes established**

It is likely that an outbreak of PPR would be eradicated provided that funds for operations and compensation are forthcoming. If the size of an outbreak outstripped the resources available for control, and ring vaccination of all sheep and goats was not able to contain the disease, then it would have to be considered as being established in the sheep and goat populations.

Endemic PPR would be controlled by vaccination of all sheep and goats with an appropriate vaccine in areas where the disease occurred. Farmers would have to live with sporadic outbreaks and losses, and having to vaccinate. Vaccination of the entire susceptible population should result in the virus dying out, there as allowing discontinuation of vaccination after only a couple of years.

## APPENDIX 1 Guidelines for classifying declared areas

### Infected premises (IP)

Premises classified as IPs will be a defined area (which may be all or part of a property) in which an exotic disease exists, or is believed to exist. An IP is subject to quarantine served by notice and to eradication or control procedures.

### Dangerous contact premises (DCP)

Premises classified as DCPs will be:

- all neighbouring premises on which sheep or goats have been sharing a common fence-line with infected animals on an IP since the appearance of clinical signs and where it is considered necessary to impose disease control measures; and
- all premises to which sheep or goats have moved from an IP since 21 days before the first appearance of symptoms on the IP and where it is considered necessary to impose disease control measures.

These premises will remain under quarantine and close surveillance until 42 days after the last contact with the IP subject to continual satisfactory surveillance and final inspection.

### Suspect premises (SP)

Premises classified as SPs will be:

- all other premises owned or managed in conjunction with an IP;
- other neighbouring properties containing sheep or goats;
- all premises where it is considered that disease could possibly have spread to sheep or goats from an IP by way of the movement of people, vehicles, equipment or feedstuff during the period 21 days before to the first appearance of lesions; and
- other premises containing animals with suspicious signs.

Subject to satisfactory surveillance, premises will only be designated as SPs for 30 days.

### Restricted area (RA)

The boundary of the RA should be at least 1 km from the boundary of the IP or DCP, and there should be at least two stockproof barriers between the two. The RA should also include an area substantially greater than the home range of any susceptible feral species that may come into contact with the IPs or DCPs. Consideration should be given to any natural geographic features in setting boundaries of these areas.

### Control area (CA)

The boundary of the CA should be at least 10 km from the boundary of the RA, and there should be at least two stockproof barriers between the two. The CA must also substantially exceed the home range of any susceptible feral animals that may enter the area. Initially the CA may be a much larger area pending the determined extent of the outbreak.



## APPENDIX 2 Recommended quarantine and movement controls

### Infected and dangerous contact premises

#### *Movement out of susceptible animals:*

Movement of any sheep or goats prohibited unless permitted for immediate slaughter.

#### *Movement in of susceptible animals:*

Prohibited (1).

#### *Movement out of specified products:*

Skins, wool or fibre may be allowed under permit (2).

Sheep or goat milk products prohibited.

#### *Movement out of other animals:*

Cattle restricted (4).

#### *Movement in and out of people:*

Conditions apply (5).

#### *Movement in and out of vehicles and equipment:*

Conditions apply (5).

#### *Movement out of crops and grains:*

Conditions may apply (6).

### Restricted area

#### *Movement out of susceptible stock:*

Prohibited (7).

#### *Movement in of susceptible stock:*

Prohibited.

#### *Movement within of susceptible stock:*

Permit required (8).

#### *Movement through of susceptible stock:*

Permit required (9).

#### *Movement of specified products:*

Any animal product may be moved under permit (10).

#### *Movement of other animals, people, equipment:*

Unrestricted, but cattle require a permit (10).

### Suspect premises

As for IP/DCP.

Prohibited (3).

No restrictions.

Cattle restricted (4).

Must not visit other animals.

Unrestricted.

Unrestricted

### Control area

Permit required (7).

No movement of susceptible stock into the CA should be permitted (8).

Permit required (8).

Permit required (9)

As for RA.

As for RA.

*Vehicles:*

No restriction.

Unrestricted.

*Stock routes, rights of way:*

Prohibited.

May be permitted if absolutely necessary under strict control.

*Risk enterprises:*

Abattoirs may continue working but may not freeze sheep or goat meat.

Artificial breeding centres may continue operations as long as no clinical disease becomes evident on the premises and as long as approved protocol is observed.

Dairy factories may continue as usual with bovine milk, but sheep or goat milk must be treated to denature PPR virus.

*Sales, shows etc:*

No shows or sales involving sheep or goats within the RA or CA would be permitted.

**Notes:**

- (1) The property can be restocked 30 days after completion of decontamination if there is no evidence of spread in any remaining animals. Serological testing of sheep, goats or cattle remaining on the IP before to restocking may be warranted.
- (2) Wool or fibre may be permitted to leave if it can be shown that it was harvested well before the time the infection was deemed to have arrived on the premises, and that no contact with infected animals or things was possible, or a sufficient passage of time, say 30 days, had rendered it risk free.
- (3) It is expected that, subject to satisfactory surveillance, quarantine would be lifted after 30 days.
- (4) Subject to permit. Cattle not for slaughter must be identified for possible later serological testing.
- (5) On leaving the IP all people, vehicles and equipment will undergo cleaning and disinfection as considered appropriate.
- (6) It is unlikely that any restrictions would be placed on crops and grains unless the grain was for immediate use as stock food.
- (7) No movement of susceptible animals out of the RA or CA should be permitted while the disease is still spreading. Once it is under control movement from the CA may be allowed under permit. Movement direct for slaughter should be permitted.
- (8) If any animals moved into or within the RA or CA subsequently become infected, extra costs will be incurred. Care should therefore be taken to ensure that the risk is minimal.
- (9) Vehicles carrying susceptible animals should be allowed to pass through the RA or CA as long as they are not off loaded within the area.
- (10) The permit must record details of destination and identification of the product moved. Cattle must be identified in case they later have to be checked for seroconversion.

## APPENDIX 3 OIE International Animal Health Code for peste des petits ruminants

[NB The following text is taken directly from the OIE International Animal Health Code (1992) Chapter 2.1.5. For definitions, Appendixes, etc see the original text. The OIE Codes are amended every year in May. There have been no amendments to the code for PPR in 1993, 1994 or 1995.]

**Preamble:** For diagnostic tests, reference should be made to the *Manual* (A5) [see OIE publications under References]

### Article 2.1.5.1.

For the purposes of this *Code*, the *incubation period* for the peste des petits ruminants (PPR) shall be 21 days.

### Article 2.1.5.2.

For the purposes of this *Code*:

PPR: free country

A country may be considered free from PPR when it has been shown that PPR has not been present for at least the past three years. This period shall be six months after the occurrence of the last *case* for countries in which a *stamping-out* policy is practised, with or without vaccination against PPR.

PPR: infected zone

A PPR infected zone shall be considered as such until at least 21 days have elapsed after the last case has been reported and following the completion of a *stamping-out* policy and *disinfection* procedures, or six months after the clinical recovery or death of the last affected animal if a *stamping-out* policy is not practised.

### Article 2.1.5.3.

*Veterinary Administrations* of PPR free countries may prohibit importation or transit through their territory, directly or indirectly, from countries considered infected with PPR of:

- 1) domestic and wild ruminants;
- 2) *semen* of ruminants;
- 3) *embryos/ova* of ruminants;
- 4) *fresh meat* of domestic and wild ruminants.
- 5) *meat products* of domestic and wild ruminants which have not been processed to ensure the destruction of PPR virus;
- 6) *products of animal origin* (from ruminants) *destined for use in animal feeding* or *for industrial use* which have not been processed to ensure the destruction of PPR virus;
- 7) *products of animal origin* (from ruminants) *destined for pharmaceutical use* which have not been processed to ensure the destruction of PPR virus;
- 8) *pathological material* and *biological products* (from ruminants) which have not been processed to ensure the destruction of PPR virus.

## Article 2.1.5.4.

When importing from PPR *free countries*, *Veterinary Administrations* should require:

for domestic small ruminants

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

- 1) showed no clinical sign of PPR on the day of shipment;
- 2) were kept in a PPR free country since birth or for at least the past 21 days.

## Article 2.1.5.5.

When importing for PPR *free countries*, *Veterinary Administrations* should require:

for wild ruminants

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

- 1) showed no clinical sign of PPR on the day of shipment;
- 2) come from a PPR free country;

if the country of origin has a common border with a country considered infected with PPR:

- 3) were kept in *quarantine station* for the 21 days prior to shipment.

## Article 2.1.5.6.

When importing from countries considered infected with PPR, *Veterinary Administration* should require:

for domestic small ruminants

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

- 1) showed no clinical sign of PPR on the day of shipment;
- 2) were kept since birth, or for the past 21 days, in an *establishment* where no *case* of PPR was officially reported during that period, and that the establishment of origin is not situated in a PPR *infected zone*; and /or
- 3) were kept in a *quarantine station* for the 21 days prior to shipment;
- 4) have not been vaccinated against PPR; or
- 5) were vaccinated against PPR:
  - a) not less than 15 days and not more than four months prior to shipment in the case of *animals for breeding or rearing*; or
  - b) not less than 15 days and not more than 12 months prior to shipment in the case of *animals for slaughter*.

## Article 2.1.5.7.

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

for wild ruminants

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

- 1) showed no clinical sign of PPR on the day of shipment;
- 2) were kept in a *quarantine station* for the 21 days prior to shipment.

## Article 2.1.5.8.

When importing from PPR *free countries*, *Veterinary Administrations* should require:

for semen of domestic small ruminants

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

- 1) showed no clinical sign of PPR on the day collection and during the following 21 days;
- 2) were kept in a PPR free country for not less than 21 days prior to collection.

## Article 2.1.5.9.

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

for semen of domestic small ruminants

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

- 1) showed no clinical sign of PPR on the day of collection and during the following 21 days;
- 2) were kept in the *exporting country* for the 21 days prior to collection, in an *establishment* or *AI centre* where no *case* of PPR was officially reported during that period, and that the establishment or AI centre is not situated in a PPR *infected zone*; or
- 3) have not been vaccinated against PPR; or
- 4) were vaccinated against PPR.

## Article 2.1.5.10.(under study)

When importing from PPR free countries, *Veterinary Administrations* should require:

for embryos/ova of domestic small ruminants

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

- 1) donor females were kept in the same herd in a PPR free country for at least the 30 days prior to departure to the *collection unit*;
- 2) donor females and all other animals in the herd of origin showed no clinical sign of PPR during the 24 hours prior to departure to the collection unit and for the following 30 days;
- 3) donor females were fertilised with *semen* meeting the requirements provided in Article 2.1.5.8.;
- 4) collection unit remained free from PPR during the 30 days following collection.

## Article 2.1.5.11. (under study)

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

for embryos/ova of domestic small ruminants

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

- 1) and all other animals in the herd of origin showed no clinical sign of PPR during the 24 hours prior to departure to the *collection unit* and for the following 30 days;
- 2) were isolated in the *establishment* of origin for the 30 days prior to departure to the collection unit and were subjected to the diagnostic tests for PPR with negative results;
- 3) have not been vaccinated against PPR; or
- 4) were vaccinated against PPR;
- 5) were fertilised with semen meeting the requirements provided in Article 2.1.5.8. or 2.1.5.9.;
- 6) were transported to the collection unit without passing through a PPR *infected zone*, and that the collection unit remained free from PPR during the 30 days following collection.

#### Article 2.1.5.12.

When importing from PPR *free countries*, *Veterinary Administrations* should require:

##### for fresh meat or meat products of domestic small ruminants

the presentation of an *international sanitary certificate* attesting that the entire consignment of meat comes from animals:

- 1) which have been kept in the country since birth, or have been imported from a PPR free country;
- 2) slaughtered in an *abattoir* and found to be healthy before and after slaughter.

#### Article 2.1.5.13.

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

##### for meat products of domestic small ruminants

the presentation of an *international sanitary certificate* attesting that the:

- 1) entire consignment of meat products comes from animals slaughtered in an *abattoir* and found to be healthy before and after slaughter;
- 2) meat products have been processed to ensure the destruction of PPR virus;
- 3) necessary precautions were taken after processing to avoid contact of the meat with any source of PPR virus.

#### Article 2.1.5.14.

When importing from PPR *free countries*, *Veterinary Administrations* should require:

##### for products of animal origin (small ruminants) destined for used in animal feeding or for industrial use

the presentation of an *international sanitary certificate* attesting that these products come from animals which have been kept in a PPR free country since birth or for at least the past 21 days.

## Article 2.1.5.15.

When importing from PPR *free countries*, *Veterinary Administrations* should require:

for products of animal origin (small ruminants) destined for pharmaceutical use

the presentation of an *international sanitary certificate* attesting that these products come from animals:

- 1) which have been kept in a PPR free country since birth or for at least the past 21 days;
- 2) slaughtered in an *abattoir* and found to be healthy before and after slaughter.

## Article 2.1.5.16.

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

for products of animal origin (from small ruminants) destined for use in the animal feeding or for industrial use

meal and flour from blood, meat, defatted bones, hooves, claws and horns

the presentation of an *international sanitary certificate* attesting that these products have been processed using heat treatment to ensure the destruction of PPR virus;

hooves, claws, bones and horns, hunting trophies and preparations destined for museums

the presentation of an *international sanitary certificate* attesting that these products:

- 1) were completely dried and had no trace on them of skin, flesh or tendon; and/or
- 2) have been adequately disinfected;

wool, coarse hair and other hair

the presentation of an *international sanitary certificate* attesting that these products:

- 1) come from animals which have not been kept in a PPR *infected zone*; or
- 2) have been processed to ensure the destruction of PPR virus, in premises controlled and approved by the Veterinary Administration of the *exporting country*;

raw hides and skins

the presentation of an international sanitary certificate attesting that these products:

- 1) come from animals which have not been kept in a PPR infected zone; or
- 2) have been adequately disinfected.

## Article 2.1.5.17.

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

for products of animal origin (from small ruminants) destined for pharmaceutical use

the presentation of an *international sanitary certificate* attesting that these products:

- 1) have been processed to ensure the destruction of PPR virus; or
- 2) come from animals which have not come from a PPR *infected zone*;
- 3) come from animals slaughtered in an *abattoir* and found to be healthy before and after slaughter.

## **APPENDIX 4 Procedures for surveillance and proof of freedom**

### **Proof of freedom**

Following an outbreak of PPR, Australia's freedom will be considered after a period of six months in which no disease is detected. PPR should be detectable from physical examination of susceptible flocks, but evidence of freedom should be supported by serological testing.

All at-risk properties must therefore be kept under close surveillance for six months. Properties considered to be at risk are all of those in the RA as well as any other properties that may have been designated DCPs or SPs by way of tracing of vehicles, people, equipment, fomites, etc.

### **Suspect or dangerous contact premises**

Daily physical surveillance of sheep and goats will be required for a period of 21 days followed by weekly inspections for a further 2 weeks. They should also be included in later serosurveillance.

### **Infected premises**

On IPs (and DCPs which have been destocked), restocking will be allowed 30 days after decontamination is completed. On IPs where some ruminants remain, serological evidence that no spread is occurring after the slaughter of the infected mob will be required prior to restocking. Surveillance visits of all restocked premises should be made weekly for 4 weeks, then fortnightly for another month.

### **Restricted area**

On other properties in the RA, surveillance visits should be made as soon as possible after detection of the first case of disease in the RA and then 1, 2, 3 and 4 weeks later.

At surveillance visits, every mob of sheep and goats must be inspected and numbers accounted for. In extensive grazing areas, where the degree of contact between groups of animals in a flock may be low, care must be taken to ensure that all groups of animals are present and healthy. Inspection will consist of clinical examination of all goats and sheep. When a large number of animals are involved all suspect animals plus a statistically-representative sample of all mobs of animals on the premises should be examined.

If feral animals are in the vicinity appropriate measures must be taken.

### **Control area**

All reports of disease must be investigated and random samples should be tested about 1 month after the last IP has been restocked and repeated 3 months later.

### **Serosurveillance**

Once the disease is confidently contained, all sheep, goat and cattle properties within the RA should be serologically sampled to provide a 95% confidence level that the disease is not present at a 10% prevalence. Flocks giving seropositive results should be further tested for evidence of infection. This should take place about 1 month after the last IP has been restocked and repeated 3–6 months later.



## GLOSSARY

Animal by-products	Products for industrial use, such as hides, fur, wool, hair, bones, fertiliser.
Animal products	Products of animal origin for human consumption, animal feeding or for pharmaceutical use (meat, eggs, milk, offal, meatmeal, bonemeal, etc).
AUSVETPLAN	A series of documents that describe the Australian response to exotic animal diseases, linking policy, strategies, implementation, coordination and emergency-management plans.
Consultative Committee on Exotic Animal Disease	A committee of State/Territory CVOs, AAHL and CSIRO, chaired by the CVO of Australia (Cwlth DPIE), to consult in emergencies due to the introduction of an exotic disease of livestock, or serious epizootics of Australian origin.
Control area	A declared area in which defined conditions apply to the movement into, out of, and within, of specified animals or things. Conditions applying in a control area are of lesser intensity than those in a restricted area ( <i>see</i> Appendix 1).
Dangerous contact animal	An animal showing no clinical signs of disease but which, by reason of its probable exposure to disease, will be subjected to disease control measures.
Dangerous contact premises	Premises containing a dangerous contact animal(s) ( <i>see</i> Appendix 1).
Declared area	A defined tract of land for the time being subject to disease control restrictions under exotic disease legislation. Types of declared areas include <i>restricted area</i> ; <i>control area</i> ; <i>infected premises</i> ; and <i>dangerous contact premises</i> .
Decontamination	Includes all stages of cleaning and disinfection.
ELISA	Enzyme-linked immunosorbent assay — a serological test designed to detect and measure the presence of antibody or antigen in a sample. The test uses an enzyme reaction with a substrate to produce a colour change when antigen–antibody binding occurs.
Fomites	Inanimate objects (eg boots, clothing, equipment, vehicles, crates, packagings) that can carry the exotic agent and spread the disease through mechanical transmission.
In-contact animals	Animals that have had close contact with infected animals such as non-infected animals in the same mob.
Incubation period	The period which elapses between the introduction of the pathogen into the animal and the occurrence of the first clinical signs of the disease.
Infected premises	<i>see</i> Appendix 1.
Local disease control centre	An emergency operations centre responsible for the command and control of field operations in a defined area.

Movement controls	Restrictions placed on movement of animals, people and things to prevent spread of disease.
Premises	A defined area or structure, which may include part or all of a farm, enterprise or other private or public land, building or property.
Quarantine	Legal restrictions imposed on a place, animal, vehicle or other things limiting movement.
Restricted area	A declared area in which defined rigorous conditions apply to the movement into, out of, and within, of specified animals, persons or things ( <i>see</i> Appendix 1).
Risk enterprise	A livestock or livestock-related enterprise with a high potential for disease spread, eg an abattoir, milk factory, artificial breeding centre or livestock market.
Sentinel animals	Animals of known health status monitored for the purpose of detecting the presence of a specific exotic disease agent.
Seroconversion	Appearance in the blood serum of antibodies following vaccination or natural exposure to a disease agent.
Serosurveillance	Surveillance of an animal population by testing serum samples for the presence of antibodies to disease agents.
Serum neutralisation test	A type of serological test designed to detect and measure the presence of antibody in a sample. The test is based on the ability of an antibody to neutralise the biological activity of an antigen.
Spell	Keep unused for a period of time until there is no risk of disease agent remaining.
Stamping out	Eradication procedures based on quarantine and slaughter of all infected animals and animals exposed to infection.
State/Territory disease control headquarters	The emergency operations centre that directs the disease control operations to be undertaken in the State/Territory.
Surveillance	A systematic program of inspection and examination of animals or things to determine the presence absence of an exotic disease.
Susceptible species	Animals that can be infected with the disease (for PPR — goats and sheep; perhaps deer).
Suspect animal	An animal that may have been exposed to an exotic disease such that its quarantine and intensive surveillance is warranted; OR an animal not known to have been exposed to a disease agent but showing clinical signs requiring differential diagnosis.
Suspect premises	Premises containing suspect animals which will be subject to quarantine and intensive surveillance ( <i>see</i> Appendix 1).
Tracing	The process of locating animals, persons or things that may be implicated in the spread of disease, so that appropriate action be taken.

## Vaccines

– attenuated ('live') A vaccine prepared from infective or 'live' microbes that have lost their virulence but have retained their ability to induce protective immunity.

– inactivated A vaccine prepared from a virus that has been inactivated ('killed') by chemical or physical treatment.

## Vector

A living organism (frequently an arthropod) that transmits an infectious agent from one host to another. A *biological* vector is one in which the infectious agent must develop or multiply before becoming infective to a recipient host. A *mechanical* vector is one that transmits an infectious agent from one host to another but is not essential to the life cycle of the agent.

## Viraemia

The presence of viruses in the blood.

## Zoning

Dividing a country into defined infected and disease-free areas. A high level of movement control between zones will apply.

## Abbreviations

AAHL	CSIRO Australian Animal Health Laboratory, Geelong
AUSVETPLAN	Australian Veterinary Emergency Plan
ARMCANZ	Agricultural and Resource Management Council of Australia and Zealand
CA	Control area
CCEAD	Consultative Committee on Exotic Animal Disease
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CVO	Chief veterinary officer
DCP	Dangerous contact premises
DPIE	Department of Primary Industries and Energy
EDTA	Ethylene diamine tetra-acetic acid (anticoagulant for whole blood)
IEMVT	Institut d'Elevage et Médecine Vétérinaire, France
IP	Infected premises
OIE	World Organisation for Animal Health [Office International des Epizooties]
PPR	Peste des petits ruminants
RA	Restricted area
RBOK	Attenuated cell culture-adapted rinderpest virus vaccine
SP	Suspect premises

## REFERENCES

- Australian Bureau of Agriculture and Resource Economics (ABARE) (1993). *Agriculture and Resources Quarterly*, 5(2): 304.
- Anderson, J., McKay, J.A. and Butcher, R.N. (1991). The use of monoclonal antibodies in competitive ELISA for the detection of antibodies to rinderpest and peste des petits ruminants viruses. In *The Sero-monitoring of Rinderpest throughout Africa*, International Atomic Energy Agency, Vienna.
- Brown, C.C., Mariner, J.C. and Olander, H.J. (1991). An immunohistochemical study of the pneumonia caused by peste des petits ruminants virus. *Vet Pathol*, 28: 166-170.
- Dardiri, A.H., DeBoer, C.J. and Hamby, F.M. (1976). Response of American goats and cattle to peste des petits ruminants virus. In *Proceedings of the 19th Annual Meeting of the American Association of Veterinary Laboratory Diagnosticians*, Miami Beach, Florida, pp 337-344.
- Geering W.A. and Forman A.J., Nunn, M.J. (1995). *Exotic Animal Diseases: A Field Guide for Australian Veterinarians*, Bureau of Resource Sciences, Department of Primary Industries and Energy, Australian Government Publishing Service, Canberra.
- Hamby, F.M. and Dardiri, A.H. (1976). Response of white-tailed deer to infection with peste des petits ruminants virus. *J. Wildlife Diseases*, 12:516-522.
- Komolafe, O.O., Ugwu, H.O. and Ehirim, R.A. (1987). An investigation into the possible role of peridomestic rats in the epidemiology of peste des petits ruminants in goats. *Bulletin of Animal Health and Production in Africa*, 35(3):207-210.
- Lefevre, P.C. and Diallo, A. (1990). Peste des petits ruminants. *Rev Sci Tech*, OIE, 9(4):951-965.
- Nawathe, D.R. and Taylor, W.P. (1979). Experimental infection of domestic pigs with the virus of peste des petits ruminants. *Trop Anim Hlth Prod*, 11: 120-122.
- New Zealand Ministry of Agriculture and Fisheries (NZMAFF) (1991a). Peste des petits ruminants. *Surveillance*, 18(3):19-20.
- NZMAF (1991b). *The Importation into New Zealand of Meat and Meat Products: A Review of the Risks to Animal Health* (ed S.C. MacDiarmid) [The New Zealand Meat Manual], MAF, New Zealand.
- Scott, GR (1981). Rinderpest and peste des petits ruminants. In: *Virus Diseases of Food Animals, Volume 2*, (ed E.P.J. Gibbs), Academic Press, London.

## Further reading

- Braide, V.P. (1981). Peste des petits ruminants, a review. *FAO World Animal Review*, 39: 25-28.
- Ismail, I.M. and House, J. (1990). Evidence and identification of peste des petits ruminants from goats in Egypt. *Archiv fur Experimentelle Veterinarmedizin*, 44(3):471-474.
- Mahdy, M.M. et al (1988). Pathological studies of rinderpest like diseases in deer and goats in the United Arab Emirates. *Egyptian Journal of Comparative Pathology and Clinical Pathology*, 1(1):36-44.
- Taylor, W.P. (1984). The distribution and epidemiology of peste des petits ruminants. *Preventive Veterinary Medicine*, 2:157-166.

## Video/training resources

*Out of Africa — rinderpest and other erosive diseases* (video), AAHL (available from the Animal Diseases/Incidents Section, DPIE, Canberra; or AAHL).

*Erosive diseases — rinderpest and others* (50 slides), (available from the Animal Diseases/Incidents Section, DPIE, Canberra).

## OIE publications

OIE Code (1992). *International Animal Health Code* (6th edition), OIE, Paris, France.

OIE Manual (1992). *Manual of Standards for Diagnostic Tests and Vaccines* (2nd edition), OIE, Paris, France.

## INDEX

- AAHL diagnostic tests, 4
- Abbreviations, 27
- Aetiology, 1
- Australian Animal Health Laboratory, 3
- CCEAD, 12
- Chief veterinary officer, 12
  - States, 3
- Clinical signs, 2
- Compensation, 15
- Control and eradication
  - feasibility, 10
  - principles, 7
  - strategy, 12
- Control area, 7, 16, 17
- Dangerous contact premises, 7, 16, 24
- Declared areas
  - classifying, 16
- Decontamination, 9, 14
- Destruction of animals, 8
- Diagnosis
  - criteria, 2
  - differential, 4
- Disposal, 9
- Epidemiology, 5
- Established disease
  - strategy, 15
- Fomites, 6
- Funding, 15
- Histopathology, 3
- Immunity, 4
  - active, 5
  - innate, 5
  - passive, 5
- Incubation period, 5
- Infected premises, 7, 16, 24
- Introduction to Australia, 6
- Laboratory diagnosis, 4
- Laboratory Tests, 3
- Laboratory tests
  - specimens required, 3
- Lesions, 2
- Meat, 6
- Media, 10
- Movement controls, 7, 12, 17
- Occurrence in Australia, 2
- OIE Code, 19
- OIE publications, 29
- Persistence of virus, 5
  - carcasses, 6
  - environment, 5
  - general properties, 5
  - live animals, 6
- Persistence of virus animal products, 6
- Policy
  - overall, 11
- Policy and eradication, 11
- Proof of freedom, 24
  - criteria, 14
- Public awareness, 10
- Quarantine, 7, 12, 17
- Resistance, 4
- Restocking measures, 10
- Restricted area, 7, 16, 17, 24
- Sentinels, 10
- Serosurveillance, 24
- Social and economic effects, 14
- Specimens, 3
  - transport, 4
- Stamping out, 12
- Surveillance, 8, 24
- Susceptible species, 1
- Suspect premises, 16, 24
- Tracing, 8
- Tracing and surveillance, 13
- Training resources, 29
- Transmission, 6
  - animal products, 6
  - artificial breeding, 6
  - live animals, 6
- Treatment
  - animal products, 13
  - by-products, 13
  - infected animals, 8, 13
  - products/by-products, 9
- Vaccination, 5, 10, 13
- Vaccine
  - rinderpest virus, 5
- Vector control, 10
- Vectors, 6
- Wild animal control, 10, 13
- World distribution, 2
- Zoning, 8, 13