Peste des Petits Ruminants (PPR)

Situation worldwide

Joseph Domenech

Workshop on PPR prevention and control in the SADC Region
10-12 June 2013, Dar es Salam, Tanzania
Animal diseases: a major problem for animal productions and human health
- Food security
- Rural development
- Small holders livelihoods
- Trade: domestic, regional, international
- Human health and well being

Globalisation
Repeated Crises
Disease Emergence
Importance of PPR

• Increasingly important viral disease of livestock
• One billion small ruminants are at risk annually
• In developing countries:
  Lowers production efficiency
  Food insecurity
  Poverty at the household level
  Particularly on livelihood poor farmers
  Trade impact
  Export restrictions

Growth in demand for mutton from 2000 to 2030 (Source: Robinson and Pozzi (2011))
Importance of PPR

High levels of mortality and morbidity rates.

Mortality rate – 90%
Morbidity rate – 50-80%

The impact of FMD can be direct and indirect. Among them are:

Mortality
Reduced productivity: milk, meet, fertility...
Restricted market access
Possible resultant loss of biodiversity and valuable genetic resources
Cost of the control activities
...

Family Paramyxoviridae
Genus Morbillivirus (like RP, ND, Distemper, Meales)

4 known genotypes (phylogenic classification of N gene sequences)

Emergence of genotype IV (Asia) in Africa
Febrile illness, mucopurulent ocular and nasal discharges, erosion of the mucosa, death caused by bronchopneumonia or severe dehydration caused by acute diarrhoea.

Symptoms are often confused with, and exacerbated by, secondary infections making PPR a difficult disease to characterise, and diagnose.

**At necropsy**, characteristic zebra markings may occur in the large intestine. Lesions also occur in the lungs showing congestion or bronchopneumonia when associated with bacterial infection.
Differential diagnosis

Respiratory signs can be due to contagious caprine pleuropneumonia (CCPP) or pasteurellosis. Pasteurellosis can also be a secondary complication of peste des petits ruminants.

Bluetongue, contagious ecthyma, foot and mouth disease, heartwater, coccidiosis mineral poisoning.
Epidemiology

The disease is highly contagious and easily transmitted by direct contact between the secretions and/or excretions of infected animals and nearby healthy animals.

Natural disease affects mainly goats and sheep. Usually more severe in goats. There are the only species having a significative role in the epidemiology of PPR.

Cattle: generally infected subclinically only.

Buffaloes: PPRV was isolated from an outbreak of rinderpest-like disease in India in 1995.

Camels: suspected to be involved in Ethiopia in 1995–1996.
Wildlife: role?

In Africa, several ruminant wildlife species are susceptible: buffalo, topi, eland, hartebeest, waterbuck, hartebeest, kob... (serological and sometimes antigen detection)
But no clinical cases in Sub Saharan Africa

In Middle and Near East: morbidity and mortality in semi captive desert ongulates hippotragines, caprines, gazelles,

In Central Asia, wild goats in Kurdistan.

In South Asia, in free ranging wildlife in Pakistan
Situation worldwide

See the presentations at the 81th OIE General Assembly of the OIE and at the Regional Commission for Africa 26-31 May 2013, Paris, France


- J Domenech: Update regarding the PPR control strategy in Africa
TRANSPARENCY AND TIMELINESS OF REPORTING

Trends in animal disease reporting by region, between 2005 and 2012

Immediate notifications and follow-up reports
Main diseases reported to the OIE through immediate notifications 2005 to 2012 and corresponding number of notifications by Region

Africa
- Foot and mouth disease: 33
- Rift Valley fever: 16
- African swine fever: 16
- Highly path. avian influenza: 15
- Bluetongue: 15

Asia, the Far East and Oceania
- Highly path. avian influenza: 89
- Foot and mouth disease: 64
- Low pathogenic avian influenza (poultry): 20
- Porcine reproductive/respiratory syndr.: 9
- Pandemic influenza A H1N1 (2009): 9

Americas
- Newcastle disease: 27
- Classical swine fever: 19
- Vesicular stomatitis: 16
- Foot and mouth disease: 15
- Low pathogenic avian influenza (poultry): 13

Europe
- Newcastle disease: 75
- Highly path. avian influenza: 69
- Bluetongue: 52
- Anthrax: 33
- Low pathogenic avian influenza (poultry): 30

Middle-East
- Foot and mouth disease: 27
- Highly path. avian influenza: 21
- Bluetongue: 7
- Newcastle disease: 6
- Glanders: 5

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Six-monthly reports, 2006-2011

Fastness in submitting

1st semester 2006: 9 months
2nd semester 2006: 4.5 months

1st semester 2011: 2.8 months
2nd semester 2011: 2.5 months
Evolution of PPR in Africa, the Middle East and Asia between 2005 and early 2013, and vaccination strategies reported for 2011/2012
PPR situation in Regions

Between 2005 and early 2013, 58 countries/territories in Africa, the Middle East and Asia reported PPR present or suspected at least once.

For 2011 and 2012: (175 countries/territories reported information on PPR)

47 (27%) declared the disease present or suspected
111 (63%) notified that the disease had never been reported
17 (10%) notified that the disease had been absent between 2011 and 2012
In the Middle East and Asia, 21 reporting countries have been affected by PPR at least during the past eight years.

In Africa, 37 reporting countries have been affected by PPR during the past eight years and the disease is endemic in many countries. In 2012 and early 2013, 8 immediate notifications on PPR were submitted to the OIE by African countries.
Conclusion

- The distribution of PPR has expanded throughout the past eight years.
- It is now present over a large part of Africa and in the Middle East and part of Asia, and threatens the food security and livelihood of smallholders by affecting the development of the small ruminants’ sector as a result of the high mortality and morbidity it has been causing over a long period.
Conclusion

- The cost of vaccines and their administration as well as logistical issues make vaccination campaigns problematic in some regions.

- Despite these difficulties, all affected countries should undertake surveillance to allow prompt disease reporting, especially given the availability of sensitive and specific diagnostic tools for PPR.
Evolution of PPR distribution in the world

1942-1972

1980-1982

1987

2007

2008

2009-2012
See the presentations at the 20th Conference of the OIE Regional Commission for Africa
18-22 February 2013, Lome, Togo

- K Ben Jebara: Situation zoosanitaire des Pays Membres de la Commission Régionale de l’OIE pour l’Afrique en 2012,
- J Domenech: PPR Situation in Africa
Reoccurrences in 2012 & 2013

- Algeria (in Ghardaïa in March 2012 and later in January 2013)
- Comoros (in Grande Comore in September 2012)
- Egypt (in Al Qahirah and Al Isma‘iliyah in August 2012)
- Tunisia (in Sidi Bouzid in April 2012, and later in several regions of the country, including Sidi Bouzid and the neighbouring regions of Ariana and Gafsa in August 2012)
- A first occurrence was reported by Angola (in Cabinda in October 2012)
- An unexpected increase in morbidity and mortality of PPR was reported by Congo (Dem. Rep. of the) in January 2012
Situation in Africa

2008

2009

2010

2011
Number of new epidemiological events notified in Africa 2012 and beginning of 2013
Time between alert message and corresponding immediate notification

- Dans les premières 24 heures: 50%
- Entre 2 et 7 jours: 25%
- Entre une semaine et un mois: 15%
- Plus d’un mois: 10%
Six-monthly reports for the period 2005 - 2012

<table>
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<th>2nd Semi</th>
<th>1st Semi</th>
<th>2nd Semi</th>
<th>1st Semi</th>
<th>2nd Semi</th>
<th>1st Semi</th>
<th>2nd Semi</th>
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<th>2nd Semi</th>
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</table>

- Maladies des animaux terrestres
- Maladies des animaux aquatiques
Fastness in submitting the first six-monthly reports, 2012 (terrestrial and aquatic diseases)

*Les frontières entre le Nord-Soudan et le Sud-Soudan n’ont pas encore été officiellement validées par ces deux pays*
Time between the date of the first OIE request for complementary information after submission of the 2012 first six-monthly report by the country and date of receiving the country response
PPR: diagnostic and prevention

*Les frontières entre le Nord-Soudan et le Sud-Soudan n'ont pas encore été officiellement validées par ces deux pays*
National activities to control PPR

- Coordination meetings in 2012: North Africa (REMESA, EC); Angola-Dem. Rep Congo-Zambia

- Control programmes: Angola (vaccination (Northern region), surveillance); South Africa (passive surveillance and diagnostic capabilities strengthened); Togo (vaccination, goal: 70% vacc coverage in 3 years)

- Simulation exercises: Mozambique

- Preparation of new national control programmes: Mozambique (vaccination and diagnostic tests); Nigeria (vaccination, transborder cooperation); Zimbabwe (vaccination, communication)
PPR control programs in Africa

- VACNADA. 2011: 17,4 millions vaccination in 14 pays concernés, diagnostic and vaccine production
- LEISOM: 2,4 millions vaccination in Somalie
- AU-IBAR with ILRI, 2012: pilot studies in two Eastern African countries (thermostable vaccine, institutional delivery systems)
- IAEA: support to 10 African laboratories (sequencing)
- FAO: support to countries (emergency vaccination, epidemiology surveillance, diagnostic, socio-économics, delivery systems)
AU-IBAR, IGAD and FAO initiative in Eastern Africa

The SHARE programme in IGAD Region

PPR and small ruminant diseases control for building resilience amongst the pastoralist communities of the Horn of Africa

Epidemiological and socio-economic situation, roadmaps, methodology/strategy development, delivery systems, regional coordination, knowledge gaps...
PAN AFRICAN PROGRAM FOR PROGRESSIVE CONTROL OF PESTE DES PETITS RUMINANTS (PPR) IN AFRICA

Conference of the Ministers in charge of animal resources of the African Union

Abidjan, Cote d’Ivoire, April 2013
Vaccine Standards and Pilot Approach to PPR Control in Africa (VSPA)

An OIE project funded by the Bill and Melinda Gates Foundation
Three components of the project

- The establishment of a PPR Vaccine Bank,
- The strengthening of the capacities of the Pan African Veterinary Vaccine Centre of the African Union (AU/PANVAC)
- The development of a pilot strategy to progressively control/eradicate PPR in 2-3 countries.
Other regional activities

• GCC+ Yemen: FAO PPR sub-regional meeting, 1-3 April 2013, Riyadh, Kingdom of Saudi Arabia

• South Asia:
  SAARC countries: Roadmap meeting
  Bangladesh

• India: National control programmes
Available tools

Laboratory diagnostic tests

- Virus isolation, IFI, Immunocapture

- Serological Analysis: c-Elisa, VNT

- Molecular biological techniques: Conventional RT-PCR, Quantitative RT-PCR, Sequencing
Code relevant articles regarding PPR

In OIE Terrestrial Animal Health Code

Chapter 14.8. Peste des Petits Ruminants

Related to import of animals and animal products (science based and risk analysis approaches)
Manual relevant articles regarding PPR

In OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals, 2012

CHAPTER 2.7.11.
PESTE DES PETITS RUMINANTS
(12 pages)

SUMMARY
A. INTRODUCTION
B. DIAGNOSTIC TECHNIQUES
C. REQUIREMENTS FOR VACCINES
REFERENCES
PVS Evaluation

PVS Gap Analysis

OIE PVS Legislation missions, Veterinary Education (twinnings) Veterinary Stat Body (twinnings) Laboratory PVS Gap Analysis, One Health PVS mission.

PVS Pathway Follow-up Eval. Round tables with donors.

A continuous Process to improve the compliance of VS with international standards
Veterinary education

Recognition of veterinary qualifications.
Promotion of professional excellence throughout the world

- Minimum curriculum
- Evaluation
- Twinnings
Disease information

GLEWS
Global Early Warning System
The FAO OIE Crises Management Center

Activity Summary
Fifth Steering Committee Meeting
(September 2010 – October 2011)
Surveillance, Regional Networks

- Methods: active, passive, randomized, targeted
- Risk identification:

South East Asia LabNet EpiNet

Epi Networks: back to back with Labor. Networks
Permanent institutional cooperation

FAO - Food and Agriculture Organization
WHO - World Health Organization
WTO - World Trade Organization
IPPC - International Plant Protection Convention
World Bank
CABI - CAD International
ILRI - International Livestock Research Institute

And cooperation with Regional public organisations and private sector bodies
(more than 50 agreements)
## Vaccines

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Nigeria 75/1</th>
<th>PPR Sungri96</th>
<th>PPR Arasur 87</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Passage &amp; Origin</strong></td>
<td>LK-6, BK-2, Vero-70 Nigeria. sheep</td>
<td>Vero, 60 North India, goat</td>
<td>Vero 75 South India, Sheep</td>
</tr>
<tr>
<td><strong>Complete CPE</strong></td>
<td>3-6 days</td>
<td>3-6 days</td>
<td>2-3 days, rapid growing</td>
</tr>
<tr>
<td><strong>Safety in Pregnancy</strong></td>
<td></td>
<td>Safe in pregnancy</td>
<td></td>
</tr>
<tr>
<td><strong>Lineage</strong></td>
<td>I based on F gene</td>
<td>IV based on F gene</td>
<td>IV based on F gene</td>
</tr>
<tr>
<td><strong>Usage</strong></td>
<td>Extensively used in several countries</td>
<td>Extensively used in India &gt; 20 million doses</td>
<td>used in some states of India</td>
</tr>
<tr>
<td><strong>Virus Sequence</strong></td>
<td>Full genome sequenced</td>
<td>Nearly Full genome sequenced</td>
<td>Not available</td>
</tr>
</tbody>
</table>

**Quality controlled**

**Compliance with OIE standards (Terrestr. Manual)**
FAO OIE GF TADs PPR
Working Group meetings

PPR has been included in the Regional 5 years Action Plans of Africa, the Middle East and South Asia

Preparation of a Global PPR Control Strategy
Consultation process for the elaboration of the PPR Global Strategy

Similar to the preparation of the FMD Global Strategy

- With experts, national and regional authorities, policymakers, development partners and private industry: Workshop to be organized

- Lessons learned from regions

- The Global Framework for the Progressive Control of Transboundary Animal Diseases GF-TADs) provides the governance structure to prepare the Strategy

- Peer review of the strategy

Inputs from the OIE Scientific Commission and its Ad Hoc Group
Knowledge improvements needed

- Epidemiology and socio economics
- Vaccine delivery systems: private services/public, Vets/CAHWs, cost recovery/public-private good....
- Vaccines: thermostable, DIVA, combined vaccination (immunosuppression?)
- Diagnostic tests: penside tests
Several organisations such as the OIE FAO Reference Centers develop research programmes.

OIE and FAO support these researches and they will establish a Global Research and Expertise Network with the objectives to:

- Offer technical advice and veterinary expertise to Member Countries
- Exchange scientific data and biological materials between veterinary labs
- Highlight, promote development and ensure coordination of PPR research needs
- Close link and interactions with strategy development
Thank you for your attention