KEY POINTS FOR ASF ERADICATION.
The Spanish Model

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ASFV: A old friend 1978–

MAIN WORK:
DIAGNOSIS and ERADICATION MODELS
AGENDA:

ASF. A REEMERGING DISEASE

EPIDEMIOLOGICAL SITUATION

CRITICAL POINTS

ASF VACCINE

ASF ERADICATION

THE SPANISH MODEL
ASFv IS IN GOOD FORM

Asf, genotype II
Mozambique, Madagascar, Zambia
260 Outbreaks. More 76,000 Dead pigs
OUTBREAKS 2007-2011

- **domestic, 2011**
- **wild boar, 2011**
- **domestic, 2010**
- **wild boar, 2010**
- **domestic, 2009**
- **wild boar, 2009**
- **domestic, 2008**
- **wild boar, 2008**
- **domestic, 2007**
- **wild boar, 2007**
ASF 2007-2011

4 affected countries
270 outbreaks declared
+76,000 died animals

Loesses 0.8-1 billion $US

Fuente: USDA, 2010
AFRICAN SWINE FEVER IMPORTANCES POINTS FOR CONTROL AND ERADICATION

Domestic & Wild animals affected

22 genotypes
Only type II RF
High variability

Carrier animals

Pigs & products
No vaccine available

Ticks

Clinical signs similar to other diseases CSF

Laboratory diagnosis needed

Very resistant in the environment

Freezer
ASF DIAGNOSIS:

INFECTION  DISEASES/DEAD  CARRIERS

VIRUS

Ag
Nucleid Ac

Infection  Clinical  Carriers
ASF LABORATORY DIAGNOSIS

**PPC-3/4 + PPA-1/2**

GOOD HEALTH
Antigen Detection

- **Direct immunofluorescence (DIF)**

**TIME 75 MINUTES**

Easy to use

Personal trained needed to interpretate the results

NEGATIVE  

POSITIVE  

Low sensitivity in subacute and chronic forms

Significant lack of sensitivity due to Ag-Ab complex formation. Not recommended for analysis of serum and tissue - homogenated samples after first week pi. due to false negative results.
**ASF LABORATORY DIAGNOSIS**

**DNA Detection**

**PCR: CONVENTIONAL and REAL TIME**

**TIME: 5 to 6 H**

**Most Commonly Used**

- **King et al., 2003**
- **Agüero et al., 2003**
- **Agüero et al., 2004**

**PPC-3/4 + PPA-1/2**
Develop new procedures for diagnosis and control of ASF:

- Indirect ELISA
- Immunoblotting technique
ASF Reference Laboratory

Evaluate new procedures for diagnosis and control of the disease

*Immunochromatography* – Pen side tests
OIE Twinning project

BETWEEN

Universidad Complutense de Madrid (UCM) - OIE Reference laboratory for ASF (OIE-UCM-ASF)
and
National Research Institute for Veterinary Virology and Microbiology (NRIIVVaM)
ASF PROTECTION: NO VACCINE

• NO INACTIVATED VACCINE

• ATENUATED VACCINE. NO SAFE AND ONLY PARTIAL PROTECTION in HOMOLOGOUS (CARRIERS & CRONIC F)

• NO RECOMBINAT VACCINE: NO good candidates

• NO DNA: Some Candidates

ANTIBODIES ARE RELATED WITH SOME TYPE OF PROTECTION AS WELL AS WITH CHRONIC AND ENDEMIC ASF INFECTION

• Eradication without vaccine is possible but not easy.
Endemics: Portugal and Spain.
No Endemics countries: Brazil...
PROBLEMS OF ATENUATED ASF VACCINE UNTIL NOW:

LIMITED FIELD STUDIES: PORTUGAL and SPAIN 60s-70s
EXPERIMENTAL RESULTS: SEVERAL AUTHORS

A) Release of infected virus: Low virulence strains, Chronic forms?. Carriers (Portugal, Spain 70s)

B) No sufficiently attenuated

C) Only Homologous virus protection.
ASF IMMUNE RESPONSES INVOLVED IN PROTECTION

POOR UNDERSTOOD:

• PROTECTIVE IMMUNITY AGAINST HOMOLOGOUS VIRUS (VIRUS IN LINGPHO NODES)

• THE MAIN DIFFICULTY. LACK OF NEUTRALIZING Ab and high genetic variability

• Ab PARTIAL PROTECTION. DELAY IN THE ONSET C. SIGNS

• IMPORTANCE ROLE OF NK AND CD 8. DESTROYED I. M

• SOME TYPE OF PROTECCION (Ab and CMI) OCCURS
EARLY DETECTION

CONTROL AND ERADICATION

THE CHALLENGE

ARE WE AWARE?

ARE WE MOTIVATED?
ASF EARLY DETECTION NEEDED:

FIELD:
- Risk information
- ASF Information

LABs:
- Good connection with field
- Good test and procedure

TRAINING: FIELD AND LABORATORY
THE SPANISH MODEL

1960 - 1995
Spanish History
&
Epidemiological situation

1921, Kenya
ASF appeared in Spain in 1960

- Spread within a undeveloped livestock sector
- 60s: Spanish economy began to take off
- In a few years, from back yard to intensive pig productions systems

TODAY SPAIN IS THE 2º EU
Swine Production System
Swine Sector in the 60s

Kgrs/person/year: 8

CENSUS: 6.032.000

PRODUCTION: 258.000 Tm
Swine Sector in the 1986

Kgrs/person/year: 33

CENSUS: 13,386,000

PRODUCTION: 1,167,000 Tm

OPEN BORDER FOR IMPORTATION
WE CAN NOT EXPORTATION

COORDINATED PROGRAM

MOTIVATION
ASF. Spain: 1985-1995

IN DOOR
ERRADICACIÓN

1960

1989

1991

1993
ERRADICACIÓN II

A.S.F. SITUATION FROM 1994
(Decision: 94 / 476 / EC, of 15.07.94)

INFECTED AREA
SURVEILLANCE AREA
FREE AREA

A.S.F. SITUATION FROM 1994
(Decision: 94 / 738 / EC, of 15.12.94)

INFECTED AREA
SURVEILLANCE AREA
FREE AREA

A.S.F. SITUATION FROM 1994
(Decision: 94 / 887 / EC, of 21.12.94)

A.S.F. SITUATION FROM 1995
(Decision: 95 / 300 / EC, of 26.07.95)

INFECTED AREA
SURVEILLANCE AREA
FREE AREA

1994
1994
1994
1995
Key Actions

1) A COORDINATED ERADICATION PROGRAMME
2) ALL AGREE WITH THE PROGRAMME
3) GOOD INFORMATION OF RISKS
4) ECONOMICAL AND TECHNICAL TOOLS
5) COMPENSATION TO FARMERS
6) MOTIVATION
PROGRAME Key

1. Network of mobile vets field teams (127 vets)

2. Serological surveillance of 100% of pig farms

3. Improvement in animal holding facilities

4. Elimination of all ASF outbreaks (stamping out)
1. Network of mobile vets field teams (127 vets)

- Sanitary control of holdings
- Animal identification
- Epidemiological surveys
- Samples collection
- Serological control at abattoirs
- Epidemiological investigations
- Promotions of *Sanitary Associations*
2. Serological surveillance of 100% of pig farms

Main needs:
- A simple, fast, accurate & specific diagnostic test (Indirect ELISA)
- A Reference Laboratory to harmonize the techniques
- A net of Regional Laboratories for serological surveillance (13 labs)

At the beginning:
- Indirect ELISA to screen samples
- IFA to confirm results

In the final stages:
- Our group developed and improved ELISA (new soluble Ag with all ASFV proteins) and a Immunoblotting assay as confirmatory instead of IFA

Consequences
- New ELISA: Better recognitions of carriers
- New Immunoblotting: Easier and more objective interpretation
- New Immunoblotting: Better recognition of weak positives
3. Improvement in animal holding facilities

- **1st objective**: to improve sanitary barriers to prevent the spread of the disease
- Hygiene measures: fences, sanitary enclosures, safe disposal of manure...

For this purpose:

- Loans at low interest rate were offered
- More than 2175 holdings were improved (1985-95)
4. Elimination of all ASF outbreaks (Stamping Out)

- All pigs in infected herds immediately slaughtered
- Samples collection for virological & epidemiological investigations
- Immediate and adequate compensation to the pig producers

**Stamping Out** is:
- A resource-intensive method of eradication
- The most cost-effective method
- Allow countries to declare ASF free in the shortest

**Stamping Out** must be:
- Applied for a period long enough to eradicate
- Accompanied by public awareness campaigns
Procedures once outbreak identified (I):

- Depopulation by **slaughtering** all pigs in the affected herd
- Cleaning and **disinfection** of all facilities during 1 month after depopulation
- **Extermination** of insects and rodents
- Removal and **destruction** of all animal feed and animal products
- **Cleansing** of manure pits by 2% sodium hydroxide
- **Incineration** of straw bedding
Procedures once outbreak identified (II):

- **Sanitary zone** of a 3 and 10 Km

- **Movement of animals**, products, feed and waste into or out the sanitary zone were restricted

- **Movement of people** to and from the area were restricted

- After implementation measures were gradually lifted (although some specific were maintained at least 3 months).
- **Protection zone**
  - 3 km radius
  - All pigs of all herds serologically screened immediately after confirmation
  - Movement prohibited for 30 days

- **Surveillance zone**
  - 10 km radius
  - Screening 30 days after cleaning & disinfection of infected holding
  - Movement prohibited for 30 days
Transmission between herds
Special Attention!

- Biosafety and sanitary measures to avoid transmission between herds played an important role in the eradication.

- Epidemiological surveys indicated that 84% in 1989 and 93% in 1990, neighbor contact as the most likely source of the new outbreaks.
V- Livestock Movement & Animal Identification

- **Movement of animals**
  - Vehicles required to be washed and disinfected
  - Animals in transit previously identified & provided with veterinary certificate (stating origin & sanitary situation)

- **Abattoir**
  - Vets checking the sanitary certificate (before slaughtering)
  - Life pigs inspected *antemortem* & tissues *postmortem*
  - Sanitary certificates retained at least 1 year
  - Manufacturers retained identification of meat origin
V- Livestock Movement & Animal Identification

- Register & Identification
  - Pig farmer census was improved & completed
  - Producers & manufacturers register was improved
  - Infected farms register was daily updated
  - Annual Report of the Program development issued
Involvement and participation of farmers

- Wide publicity campaign in the mass media
- Encouraging the creation of Health Protection Group
  - Leadership role in the eradication program (voluntary)
  - Common approach against ASF
  - Serological surveillance of breeders
  - Correct sanitary infrastructures
  - Sanitary suitable program for ASF
  - Aids from Administration
  - 1990: 1,000 HPG created grouping 41,500 farmers & 1m animals
  - A register was created classifying farms (health status & facilities)
VI- Regionalization

- As a result of the progress...
  - 1989 ECC authorizes dividing Spain into 2 regions:
    - ASF-free region (largest part of the country & 70% of pig population)
    - ASF-infected region
  - Consequently prohibition of trade was lifted (from ASF-free regions)
TWO MAIN PROBLEMS
ELISA for O.E.

Soluble Salivary Gland of O.E.

Asf Ag (Vp 73)

Swine Sector now

65 Kg/P/Y

- CENSUS: 26,675,267
- 2º EU
- 33,5% PFG

Exportation in 2008: 1,250,000 Tm
REAL INTEREST TO DO IT

The most importance tool

YOU CAN DO IT

Я ВСЕГДА С ВАМИ