African swine fever (ASF) situation and control initiatives

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**ASF(1)**

**The virus:**
- DNA virus, only member of the Asfarividae
- 22 genotypes
- Stable over a wide range of temperatures and pH, so it persists in excretions, carcasses and chilled, frozen and lightly processed pork

**Hosts:**
- In Africa, ASF naturally circulates in wild suids (e.g. warthogs, bushpigs and giant forest hogs) that do not show clinical signs.
- Domestic pigs of all ages
- Feral pigs and wild boar equally susceptible
- Humans are NOT susceptible
ASF(2)

- Clinical signs:
  - Typical of a haemorrhagic fever with multiple organ involvement
  - Some genotypes provoke high mortalities (up to 100%)

- Transmission:
  - Mainly through oro-nasal route after contact with infected pigs or feeding on virus-contaminated products (swill and garbage waste)
  - When present and involved, *Ornithodoros* soft ticks can be important for virus persistence

- Impact
  - Catastrophic effects on pig production, from household to commercial
  - Serious socio-economic consequences for food security
The pig sector in the world

Pig meat production in the world (1961-2011)

Pig production is becoming an attractive venture to smallholders:

- ability to convert agro-industrial by-products and household waste into quality animal protein
- short cycle
- high prolificacy
- ability to subsist on wide range of feed resources
- high carcass yield compared to ruminants
- popular meat
The pig sector in the world

Pork production in the world by region (1961-2011)
The pig sector in the world

The 7 top producers amount for over 80% of the worldwide production.
ASF in Africa

- Endemic in Sub-Saharan Africa
- Linked to increase of pig production and increased in movements of people
- Top priority for the continent:
  - 6th widely distributed TAD
  - 4th most reported TAD
  - Increasing number of reporting countries

# of countries reporting ASF

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<th>Year</th>
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Graph showing the number of countries reporting ASF from 2008 to 2012.
ASF OUTSIDE AFRICA (1) 1960

- France 1964, 1967, 1977
- Spain 1960
- Portugal 1957, 1960
- Netherlands 1986
- Belgium 1985
- Italy 1967, 1980
- Sardinia 1978
- Malta 1978
- Cuba 1971, 1980
- Haiti 1979
- Dominican Republic 1978
- Brazil 1978
- Angola genotype I virus

Slide from ML Penrith, 2013
ASF OUTSIDE AFRICA (2) 2007

- Russia 2007 (1977)
- Georgia 2007
- Armenia 2007
- Azerbaijan 2008
- Iran 2010 Wild boar

Genotype II virus distribution area

Slide from ML Penrith, 2013
Historical ASF status worldwide
ASF timeline in Europe

- June 2007 - Georgia (pigs)
- Aug 2007 - Armenia (pigs)
- Dec 2007 - Russia (WB → pigs)
- Jan 2008 - Azerbaijan (single intro in pigs)
- Dec 08-Jan 2009 - Iran (3 WB)
- July 2012 - Ukraine (pigs)
- June 2013 - Belarus (pigs)
- Jan 2014 - Lithuania (WB)
- Feb 2014 - Poland (WB → pigs)
- June 2014 - Latvia (WB & pigs)
ASF in Russian Federation 2007-2012
The role of wild boar remains unclear;
• The wild boar-ASFV host-pathogen system can evolve and behave differently in different settings (i.e. density dependent, temperature dependent);
• Wild boar has a strong potential for transboundary spread of ASF;
• Hunting management and veterinary services should cooperate closely;
• Controversy on the best way to deal with ASF in wild boar.
Transboundary spread

How does ASFV spread across borders?

- Informal movements of pork
  - Small amounts brought by individuals
  - Illegal shipment of large quantities of pork
  - Catering waste from airplanes and ship
- Wild boar
- Informal movements of animals
- Formal movement of animals and pork
  - Returning pig transporting tracks

How does the virus infect susceptible hosts

- Swill feeding
- Free-ranging scavenging pigs
- Wild boar

Factors

- Diaspora, tourism, foreign workers
- Neighbouring infected countries
- Continuous wild boar populations across borders

- Low biosecurity
- Low awareness
- Density of wild boar
Risk factors for Asia

- Huge pig population, which is growing very fast
The pig sector in Asia

Pork production in Asia (1961-2012)

Largely backyard with low biosecurity conditions
Risk factors for Asia

• Huge pig population, which is growing very fast
• The most important meat (63% of all meat produced in China)
• Mostly in backyard low biosecurity settings (80% in China)
• Large numbers of human movements:
  • Diaspora/Overseas, e.g. 35 million from China (2012), of which 1 million in Africa
  • Foreign workers (800,000 from China), e.g. > 800 Chinese companies operating in 49 countries in Africa (2008)
  • Tourists to/from Asia (e.g. 83 million from China in 2012, one million to Africa
    http://data.worldbank.org/indicator/ST.INT.DPRT)
• Low awareness of ASF
• Neighbouring infected countries
• Relatively high wild boar densities
  • (and apparently growing! e.g. 150,000 in Zhejiang province, compared to about 29,000 a decade ago)
ASF

• **Prevention:**
  - Risk analysis
  - Control at borders, seaports, airports,
  - Awareness & Training
  - Realistic biosecurity
  - Prevent swill feeding and scavenging

• **Control:**
  - No vaccine or treatment
  - The best approach is to prevent its entry
  - Stamping out (ONLY if compensation and infrastructure is in place)
  - Movement control
  - Awareness
Type of activities

- Coordination and Global Initiatives
- Emergency & Assessment missions
- Technical cooperation Programs (TCPs)
- Trainings
- Mapping
- Publications
- Meetings
- Research
- ASF Reference Centers
Coordination & Global Initiatives:

- The ASF Global Platform
- GARA
- ASF Strategy for Africa
- ASF Regional Sub-Networks
The ASF Global Platform

- FAO leads the establishment of a multi-stakeholder platform to coordinate ASF prevention and control at the global level
- The Platform offers a forum for all stakeholders to voice their concerns and interests
- The Platform is the opportunity for all ASF-related stakeholders to speak with one voice
- Involvement of the private sector is key
- A GF-TADs initiative

Justification

- Over the past years, the world has experienced an unprecedented upsurge of the occurrence of ASF.
- Prevention and control are challenged by the lack of coordination of national and regional initiatives and the many stakeholders involved.
- Other pig diseases are also on the rise, e.g. CSF, parasitic diseases like trichinellosis and cysticercosis.
- TADs are most effectively controlled under international frameworks that can coordinate the activities of stakeholders and provide a platform for knowledge exchange leading to the development of common approaches towards sustainable control.
The ASF Global Platform - Launching

- 5-7 November 2013
- FAO HQ, Rome, Italy
- 51 participants:
  - By Region: Africa (9), America (9), Asia (3), and Europe (29)
  - By type of organization:
    - 7 Industry: Pig Multinationals, Pharmaceuticals, Farmer and Vet Associations;
    - 16 International: FAO, OIE, AU-IBAR, EC;
    - 11 National authorities: Belarus, China, Italy, Japan, Uganda, Cameroun, Russia, US
    - 15 Research: OIE/FAO and EU Ref Labs (CISA, FADDL, Pirbright and UCM), ILRI, VNIIVViM, SVA, IZSUM, IREC, FLI, FAZD, MSU, CIRAD, University of Pretoria
    - 1 NGO
The ASF Global Platform – Mission, Vision & Goals

**Vision:** A global thriving pig sector contributing to global food security through the prevention and control of ASF and other important diseases of swine.

**Mission:** Catalyze efforts limiting the impact of ASF and extend the lessons learned to other important swine disease, through a relevant, visible and sustainable global network of all stakeholders.

**Strategic goals**

- Provide a global multi stakeholder platform to shape a joint agenda to reduce the threat of ASF and other TADs on the global pig production and support coordination of the many ASF activities and networks
- Raise awareness of the impact of ASF and the platform’s activities and outputs (guidelines....) including web based technologies and communication for outreach
- Contribute in the provision of adequate tools, guidelines and strategies to improve efficacy and effectiveness of control efforts
- Foster public-private partnerships and involvement of and investment by producers/stakeholders and establish efficient communication channels;
- Provide regional and international cooperation for the exchange of research products and sharing of expertise
- Monitor progress and showcase best practice examples
- Resource mobilization
- Strengthening regional implementation
- Provide capacity development
Global African Swine Fever Research Alliance (GARA)

• Closely coordinated with the Global Platform (the research component)

• **Mission:** To establish and sustain global research partnerships that will generate scientific knowledge and tools to contribute to the successful prevention, control and where feasible, eradication of ASF

• Open membership

• FAO is a member

ASF Regional Strategy for Africa (AU-IBAR + FAO + ILRI)

Technical Sub-Regional Workshops
- Central Africa - 19-20 Jun 2011, N’Djamena, Chad
- West Africa - 4-6 Sep 2012, Accra, Ghana

Next steps
- Drafting of the control plan
- Endorsement of the strategy by African stakeholders

Taskforce (TF) Meetings
- 16-19 July 2013, Accra, Ghana - 1st TF meeting (Vers.1 of the strategy)
- 13-15 June, Accra, Ghana - 2nd TF meeting (Vers.2 of the strategy; Proposed action plan; Proposed components of a comprehensive control program)
Emergency & Assessment missions

• **CMC emergency missions**
  - Joint FAO/OIE/EC to Georgia (June 2007)
  - Joint FAO/OIE/EC to Armenia (September 2007)
  - FAO/OIE to Belarus (May 2010)
  - FAO/OIE to Tanzania (November 2011)

• **Assessment mission** to Lugansk, Ukraine (July 2010)

• **EC continues conducting emergency assessment missions to newly infected EU (and bordering) countries**
Technical Cooperation Programmes (TCPs)

• USDA and DTRA are also providing similar assistance to Eastern European and Caucasus countries (Ukraine, Georgia and Armenia)

• Georgia, Armenia and Cape Verde (Finalized)
  • Trainings + Purchase of equipment + Awareness (Information leaflets/booklets for vets and farmers) + Surveillance + Small research projects

• Ukraine and Belarus (2014 - ongoing)
  • Technical guidance on immediate response + strategy development + Laboratory support + Revise/update surveillance protocols + Decision support systems (GIS)

• China (Just started)
Developing Prevention and Control Strategies for ASF in China (TCP/CPR/3501)

• 18 months (started in July 2014)
• The project activities will facilitate the exchange of experience and expertise between national experts and international peers

Outputs:
• Coordination and communication on ASF strengthened
• ASF diagnosis capacities improved
• The epidemiology and surveillance capacities for ASF strengthened
• National ASF contingency plan refined and finalized
Capacity building

**FAO-sponsored trainings:**

- Key component of TCPs
- **Epidemiology Training Workshops:** Ukraine: (May 2009; > 50 participants); and Belarus (May 2009; > 20 participants)
- **Lab Training Workshop:** Ukraine (March 2010; 16 diagnosticians from Belarus, Moldova and Ukraine); and Kazakhstan (with CISA-INIA; Sept 2013; 10 participants)
- **Collection and identification of *Ornithodoros* ticks:** Georgia, June 2013 (with CIRAD): 10 participants from Georgia (2), Armenia (1), Kazakhstan (1), Russia (2), Bulgaria (2), and Ukraine (1)
- **(GF-TADs) Epidemiology and Diagnosis:** Italy, Nov 2013 (with IZS-UM): 9 participants from Georgia (1), Armenia (2), Belarus (2), Russia (1), Moldova (1), Ukraine (2) and Serbia (1)

**CISA-INIA laboratory trainings:**

- Ukraine (April 2010), Belarus (January 2011)
- China (September 2010) and Vietnam
- 2007-2011: Trainings in Nigeria, Rwanda, Kenya, Uganda (25 participants from Kenya, Tanzania and Uganda) and Tanzania (30 participants from Tanzania, Kenya, Rwanda and Uganda), South Africa (25 participants from 8 Central and South African countries)

**Other partners** are also very active: USDA (in Eastern Europe), UCM, etc.

- On-line training: [http://asforce.org/course/](http://asforce.org/course/)
Host population mapping/modelling

Wild boar
- Wild boar distribution range:
  - Vectorised IUCN map of global wild boar distribution range (Oliver & Leus, 2008) refined with more detailed maps from different sources, e.g. ex-USSR (Saulich, 2007);
- Wild boar population and/or harvest estimates (sub-national level):
- Modeling is underway to produce population density map for the entire North Eurasia

Domestic pigs
- Low and high biosecurity sectors (at sub-national level)

Other mapping products
- Distribution of free-range pig production;
- Distribution of wild boar crop damage;
- ASF risk (factor) mapping and modeling;
- Pig farm mapping / databases.
Publications

Early warnings and assessments:


Manuals:

• Good practices for biosecurity in the pig sector (English, French Spanish, Russian) - [http://www.fao.org/docrep/012/i1435e/i1435e00.pdf](http://www.fao.org/docrep/012/i1435e/i1435e00.pdf)
ASF meetings (2010-2014) (1)

- 23-24 Mar 2010, Chicago, USA: ASF: Prospects for Control of a Re-emerging Transboundary Disease
- 20-24 Sep 2010, Astana, Kazakhstan, OIE: 24th Conference of the OIE Regional Commission for Europe
- 11 Oct 2010, Friedrich Loeffler Institute, Greifswald, Germany: Expert Meeting on ASF
- 26 Jan 2011, Food and Agriculture and Consumer Protection Agency, Berlin, Germany: Veterinary Expert Meeting on ASF
- 3-4 Feb 2011, EU-FMD & GFTADs, Budapest, Hungary: 1st Veterinary Forum for South East Europe
- 21-23 Mar 2011, Kyiv, Ukraine: Cross-border cooperation between veterinary services (Russian Federation and Ukraine) for ASF control and prevention
- 4-5 Dec 2012, Budapest, Hungary “Threat of ASF spread in Eastern Europe: Urgent need for international collaboration” under GF-TADs Europe
- 3-4 Sep 2013, Vilnius, Lithuania. Workshop on Strengthening and Adaptation of the Preventive Measures to the Existing Risk of Classical and ASF Introduction into the EU
- 2-3 Oct 2013, Kampala, Uganda: Understanding the epidemiology of ASF as a prerequisite for mitigation of disease impact on pig keeping in East Africa
ASF meetings (2010-2014) (2)

Wild boar issues

• 6-7 Mar 2014, SVA, Uppsala Sweden, Workshop on ASF in wild boar
• 30 Jun -1 Jul 2014, Paris, France, OIE – CIC Joint International Meeting on early detection and prevention of ASF and other animal health issues at the wildlife-livestock-human interface

Global coordination

• 3-5 Apr 2013. Plum Island, USA. Gap analysis of the scientific information and countermeasures (including promising technologies in the pipeline) available to control ASF; and Launch of a coordinated Global ASF Research Alliance (GARA)
• 5-7 Nov 2013. Rome, Italy. Launching of the Global Platform for ASF and other important swine diseases.

Workshop on Laboratory Diagnosis of ASF and CSF

• 30 May-1 Jun 2012, Hannover, Germany
• 2013, Brussels, Belgium
• 2-3 June 2014, Madrid, Spain

Technical Sub-Regional Workshops for the development of an ASF strategy for Africa

• Central Africa - 19-20 Jun 2011, N’Djamena, Chad
• Eastern Africa - 24-27 Jul 2012, Mombasa, Kenya
• West Africa - 4-6 Sep 2012, Accra, Ghana
RESEARCH

• ASFORCE
• CRP for Early and Rapid Diagnosis and Control of ASF
• ASF prevention detection and control project
• And several others...
Research (1) - ASFORCE

- [http://asforce.org/](http://asforce.org/)
- EC Research Consortium under the 7th Framework Programme (FP7)
- On a targeted research effort on ASF
- Follow-up of ASFRISK
- 36 months and 5 million EUR
- 18 partners (universities, research institutes, SMEs & FAO)
- 5 themes:
  - Theme 1 - Coordination and management
  - Theme 2 - Prevention, control & eradication models
  - Theme 3 - Pig-wild boar-Argasidae interactions
  - Theme 4 - Development of vaccines and diagnostics
  - Theme 5 - Training and knowledge transfer
IAEA Coordinated Research Project (CRP) for Early and Rapid Diagnosis and Control of ASF

• 2014-2019 (1st Meeting on 7-11 July 2014, Vienna, Austria)
• Initiative from the Joint FAO / IAEA Division for Nuclear Techniques in Food and Agriculture
• R&D will focus on improved and rapid detection platforms and the use of effective prophylactic control strategies
• Participating countries:
  • Burkina Faso, Cameroon, China, Côte d'Ivoire, Germany, Nigeria, Russian Federation, Senegal, Uganda, Zambia
• Topics covered:
  • Serology
  • Molecular diagnostics
  • Epidemiology and sequencing
  • Immunization and Immunology
ASF prevention detection and control project

• Started in September 2014
• Initial piloting of a model action research on control of ASF along the borders in the eastern Africa region i.e. Kenya/ Uganda and Tanzania/ Malawi/ Zambia
• Project Implemented by ILRI-BecA, CSIRO and FAO and funded by Australian Department of Foreign Affairs and Trade (DFAT)

Objectives:
• Develop theories of change around ASF control that complement epidemiology and social network research outputs that are already in place
• Establish innovation platforms for implementation of a prevention, detection and control (PDR) system
• Validate stakeholder perception of ASF management through impact pathway analysis along the value chain
• Develop emergency preparedness and response plans
• Generate new knowledge to inform ASF epidemiology and rapid diagnostics as well as provide platforms for scale out to other regions of Africa
EU, FAO and OIE Reference laboratories/centres in ASF

- **ARC-OVI** (Agricultural Research Council, Onderstepoort Veterinary Institute), South Africa
  - FAO and OIE

- **CISA-INIA** (Centro de Investigación en Sanidad Animal - Istituto national de investigación y tecnología agraria y alimentaria), Spain
  - EU and FAO
  - Conduct Annual Interlaboratory Comparison Test

- **Pirbright Institute**, UK
  - OIE

- **UCM** (Universidad Complutense de Madrid), Spain
  - OIE
Thanks for your attention