Pig value chain and African swine fever mitigation: a call to rally cross-program collaboration

Jean-Baka Domelevo Entfellner, Vish Nene, Lucilla Steinaa, Edward Okoth Abworo, Emily Ouma, Anna Lacasta, Naftaly Githaka

ILRI Institute Planning Meeting, Addis Ababa, 17-19 September 2019

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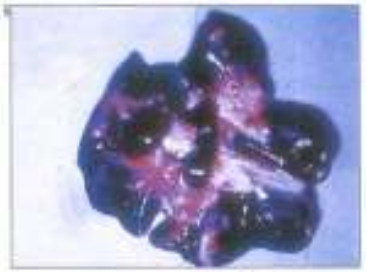
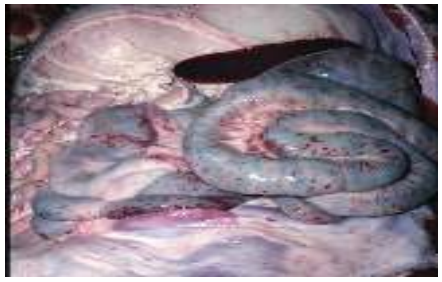
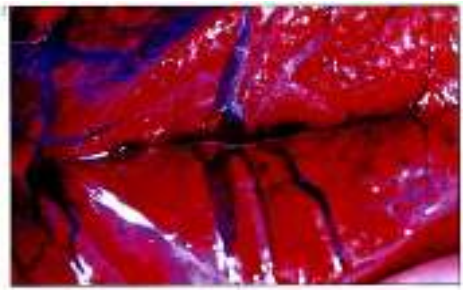
ASF etiology and symptoms

The culprit - lasts for months in jambons!

African swine fever – threatening a ~$150 billion global industry



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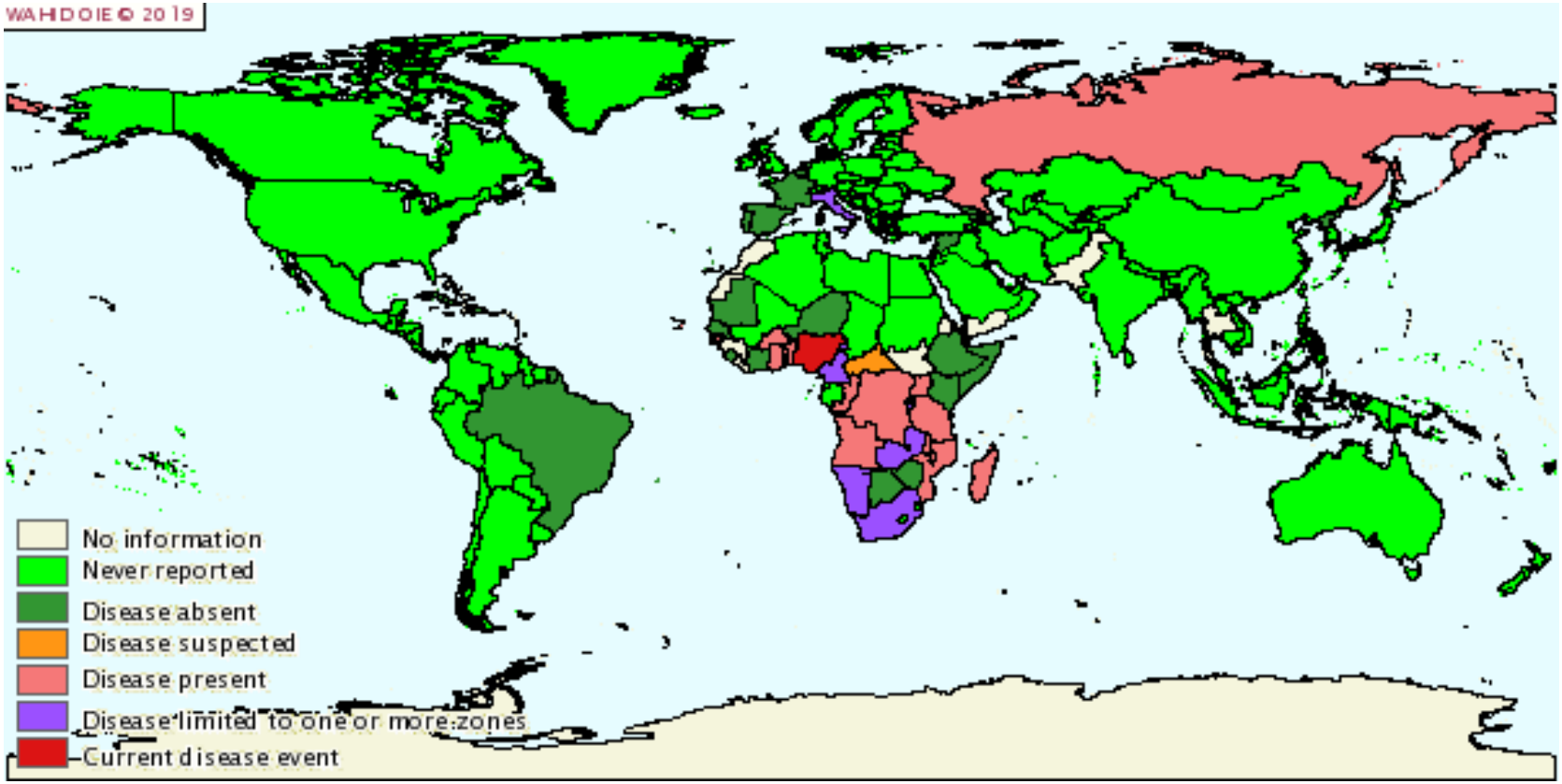
Rapid global spread of African swine fever (Africa, Asia, Europe)

S1 2009



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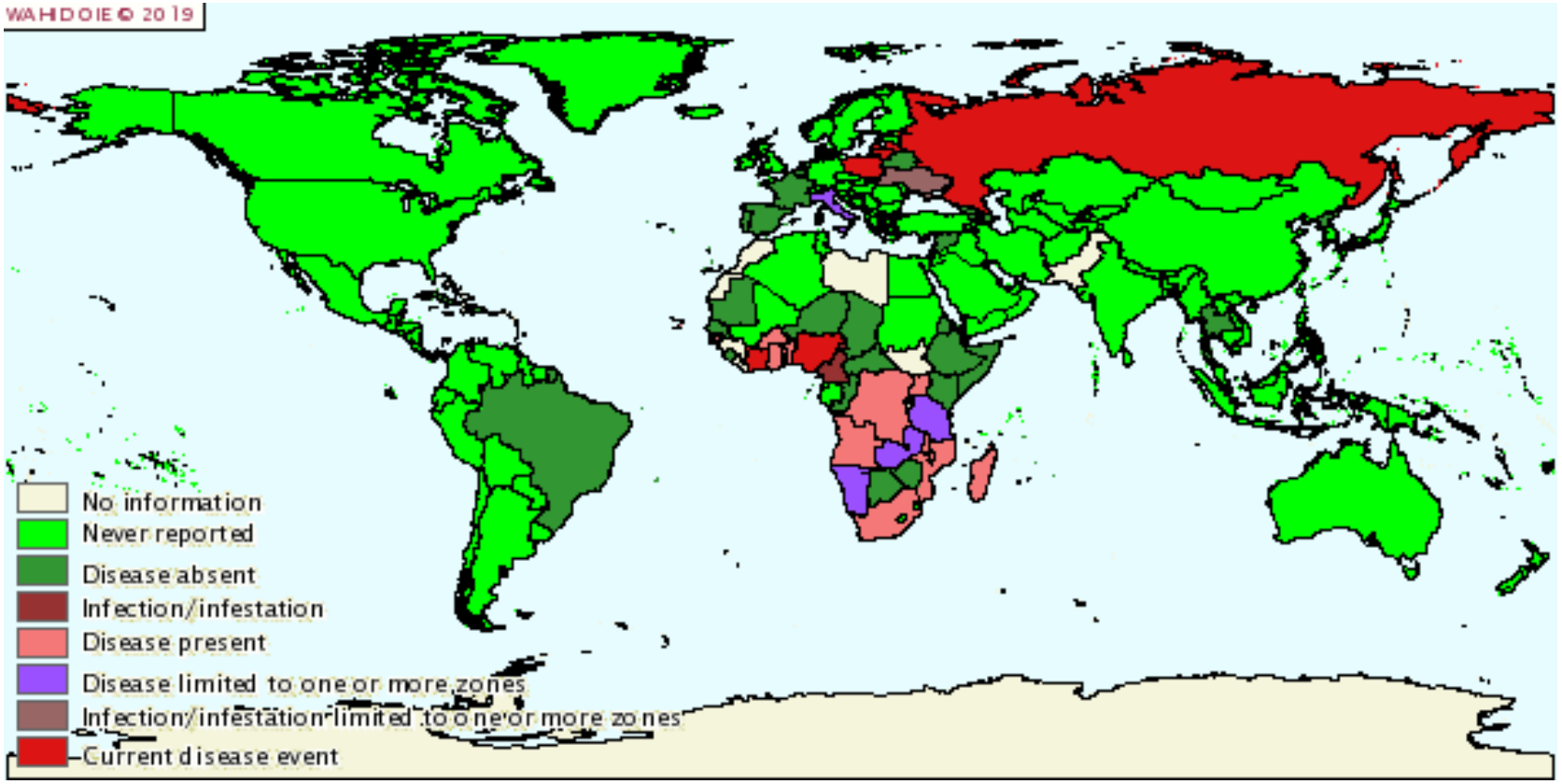
Rapid global spread of African swine fever (Africa, Asia, Europe)

S1 2014



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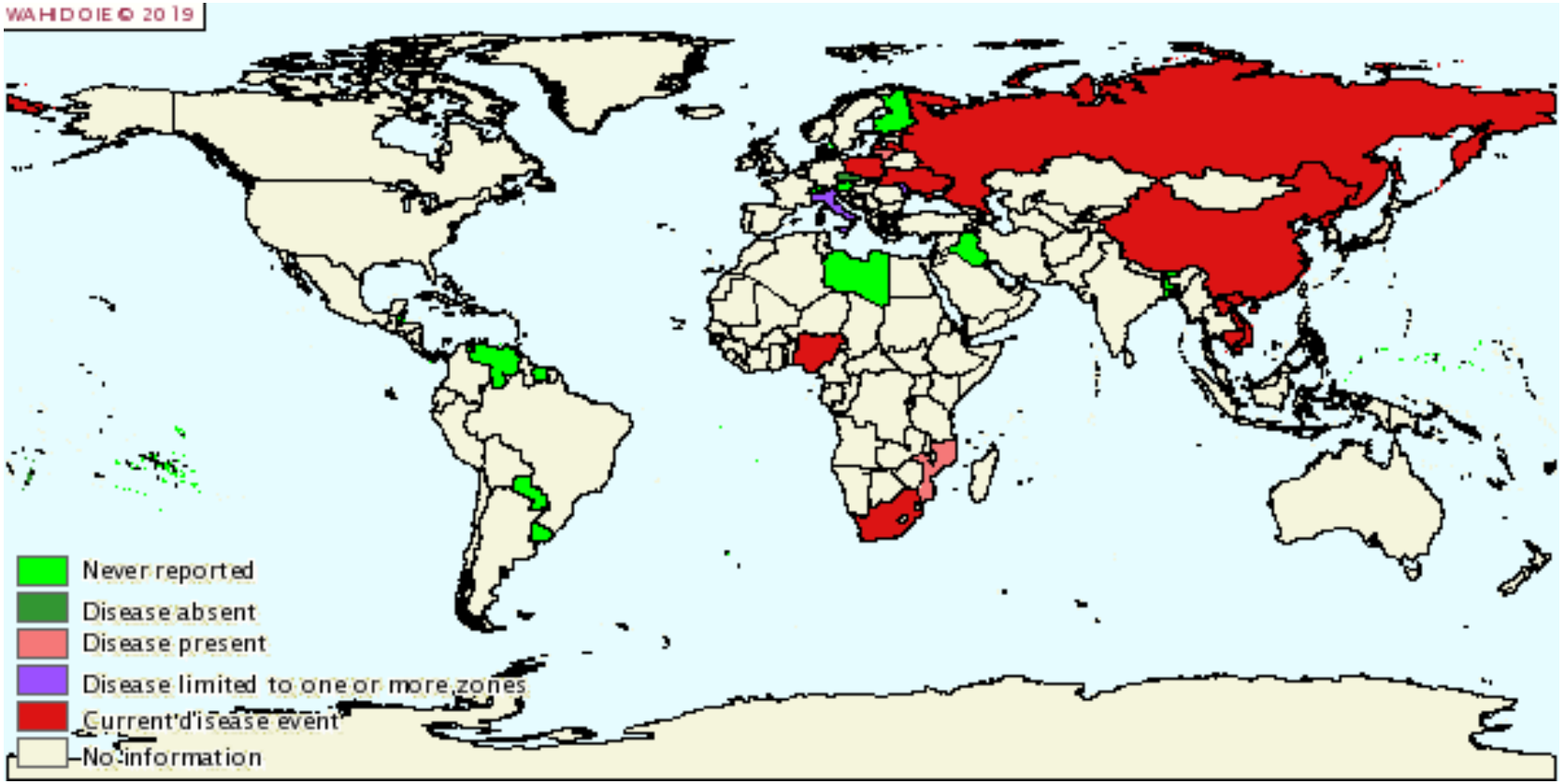
Rapid global spread of African swine fever (Africa, Asia, Europe)

S1 2019



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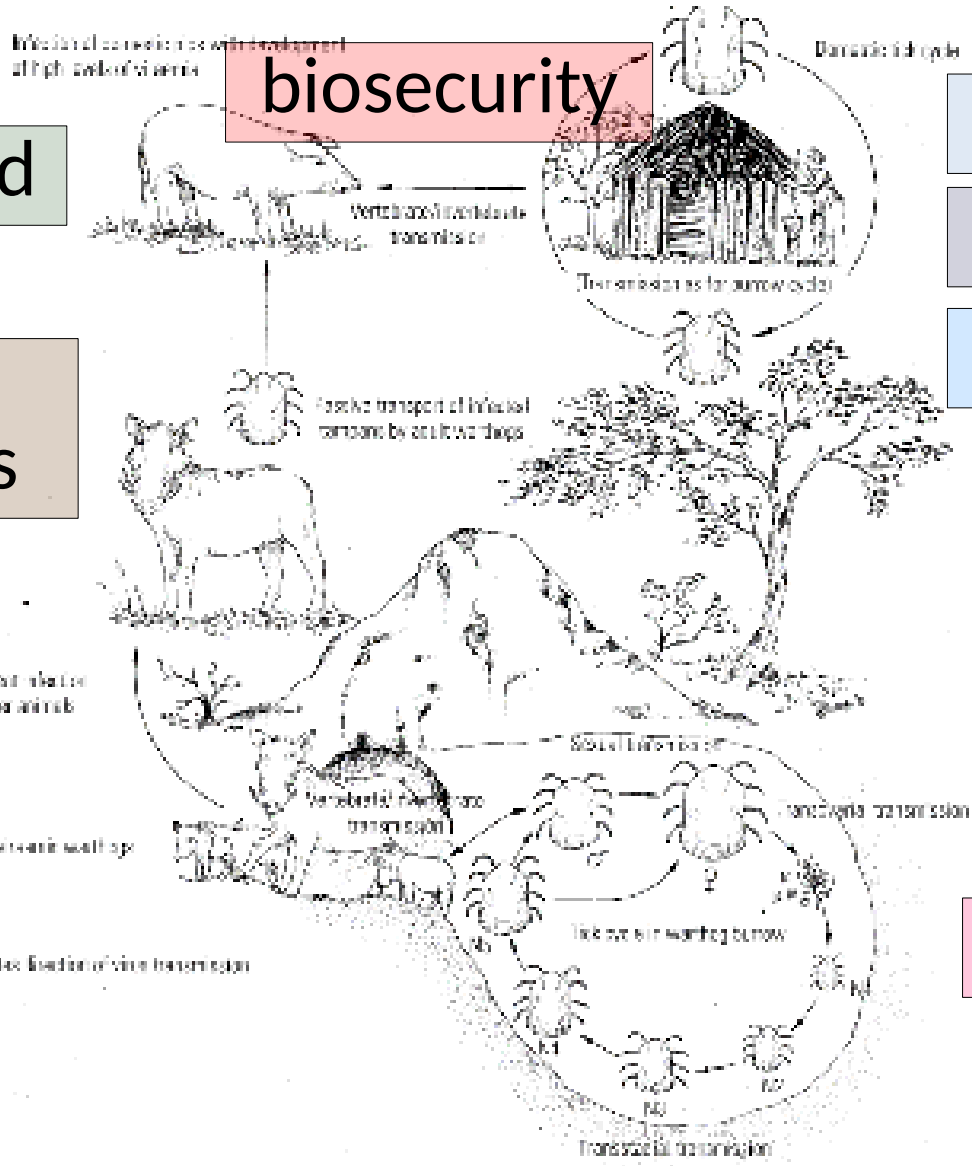
ASF in Africa

- African swine fever is present in about 26 countries in Africa. Multiple genotypes of the virus are present.
- Large double-stranded DNA virus, related to pox viruses.
- Wildlife reservoir in Africa: warthogs, bushpigs. *Ornithodoros* soft ticks can transmit ASFV.
- Impact on individuals is high: eradication of whole herds. Many women pig smallholders.
- Prevalence is under-estimated (sell quick, rather than report)

The cross-program opportunities – pigs do fly!



biosecurity

feed

livelihoods

gender

markets

host genomics

ASFV genomics

vaccine dvpt

tick host

Gender, pig diseases and husbandry

Women play a key role in the application of **biosecurity**

Pigs a direct source of **household cash** ("ATM of the poor")

Part 2 Gender-integrated health, genetics, and feed and forages research

11 THE GENDER DIMENSIONS OF A PIG DISEASE: AFRICAN SWINE FEVER IN UGANDA

Michel Dione,[1] Robert Ochago,[1,2] Emily Ouma,[1] Peter Lule[2] and Rosemarie Birungi[2,3]

[1]International Livestock Research Institute (ILRI), [2]Soroti Global 2000 Uganda, [3]Agency for Inter-regional Development, Uganda

Organizations

ILRI, Soroti 2000, AFID

Species

Methods: Literature review, key informant interviews, household

Locations

Empowering women in urban/semi-urban areas

ASFV transmission and pig value chain

A key driver of disease spread is the social network with actors of the trade node contributing the most (traders, transporters and butchers)

Preventive Veterinary Medicine

Qualitative analysis of the risks and practices associated with the spread of African swine fever within the smallholder pig value chains in Uganda

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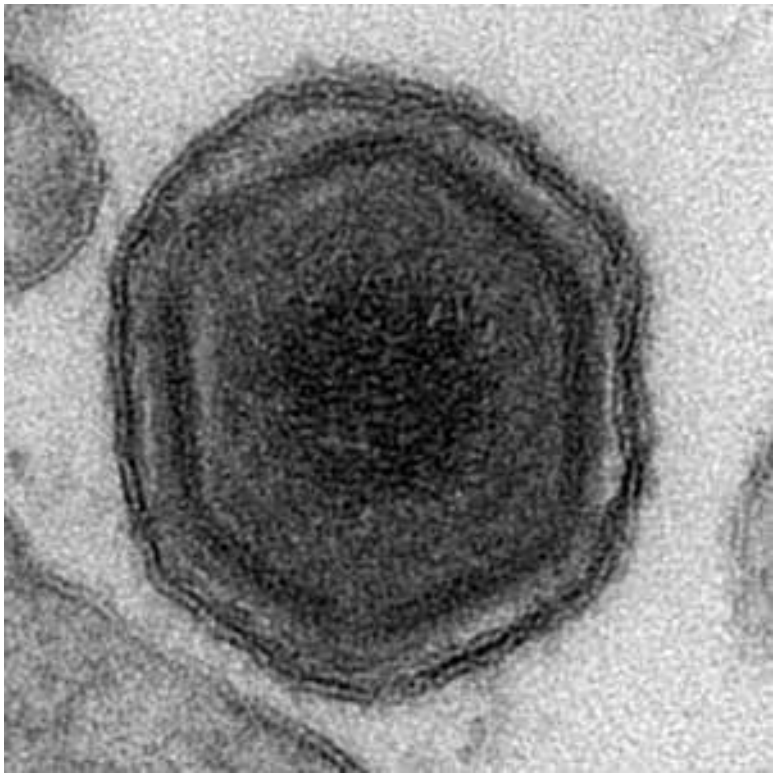
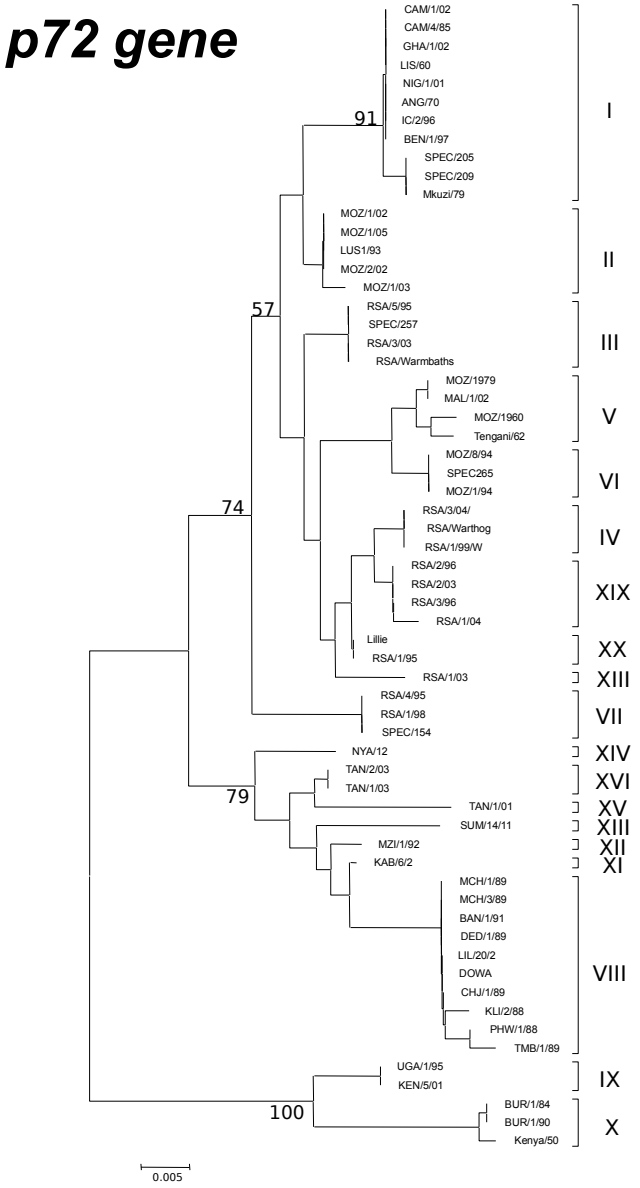
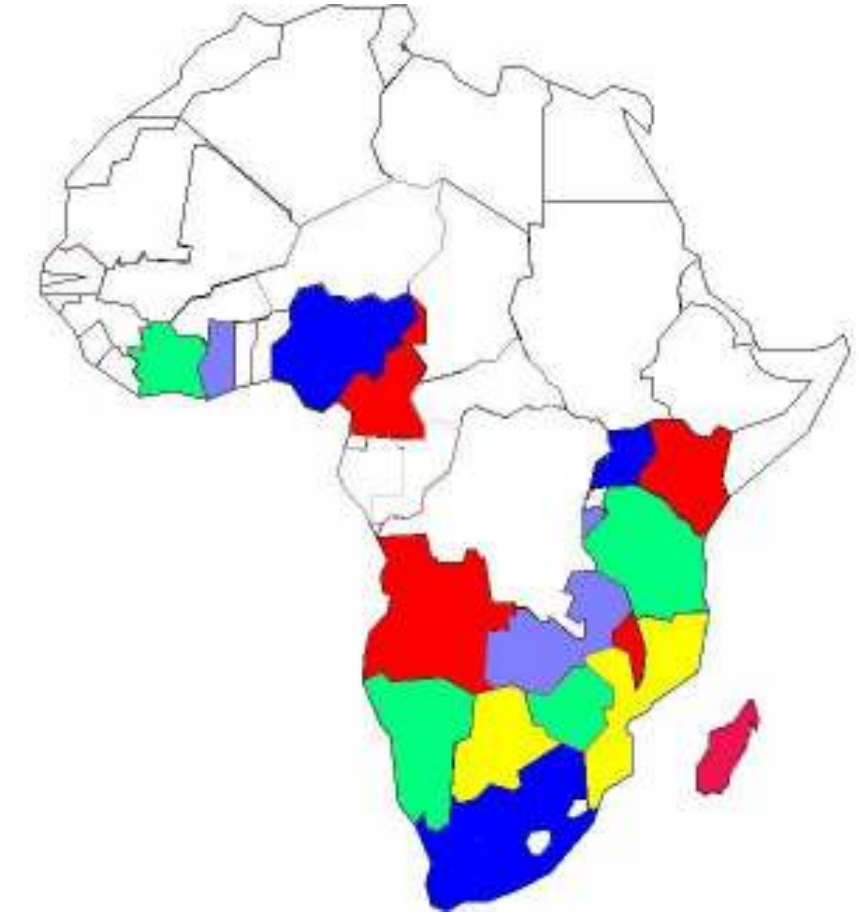
ASF genomics

- genotyping the virus
- understanding the genetic determinants of virulence level
- phylogeographics: co-study of viral evolution and geographic spread
- charting the specificity of our local, high-virulence genotypes IX and X



Molecular Epidemiology



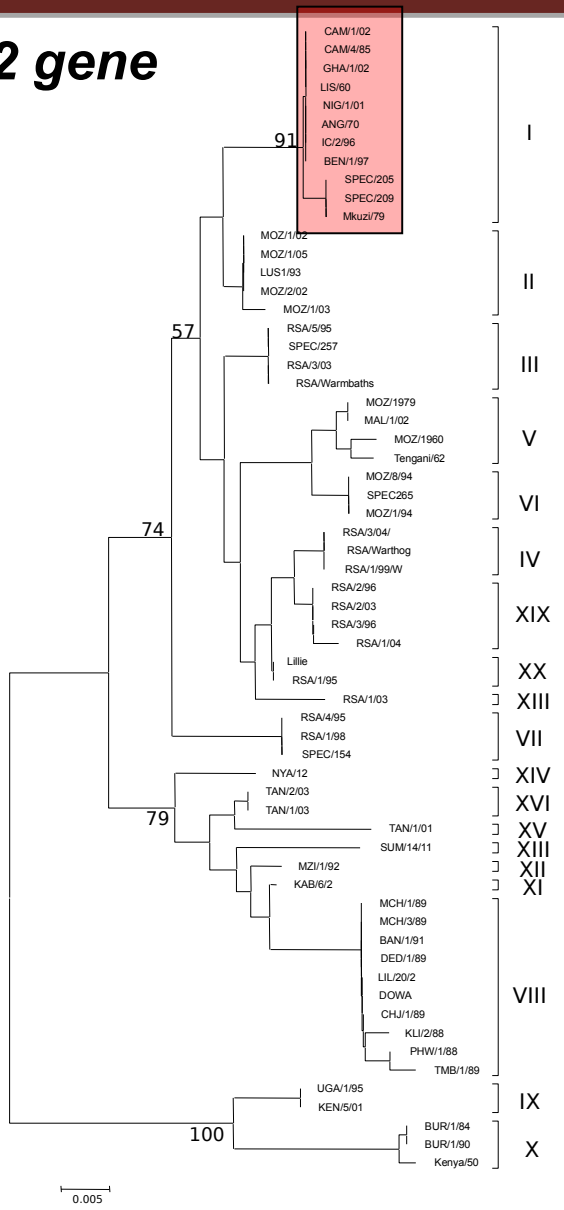


Neighbor-Joining tree depicting the p72 gene relationships and geographical distribution of the major ASFV genotypes

Contribution: Livio Heath (ARC-OVI)

Molecular Epidemiology

p72 gene



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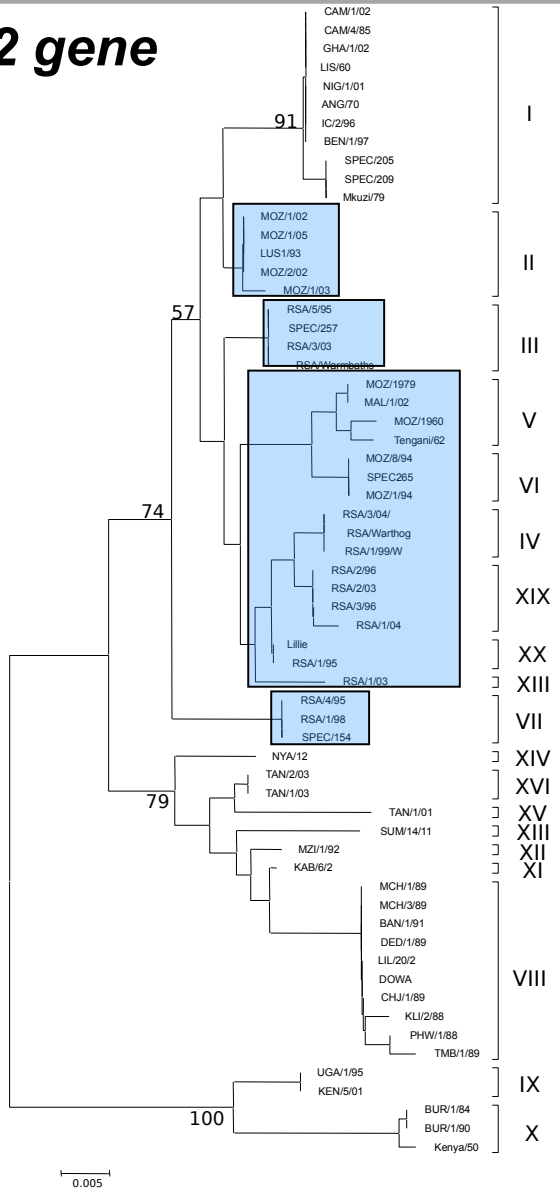

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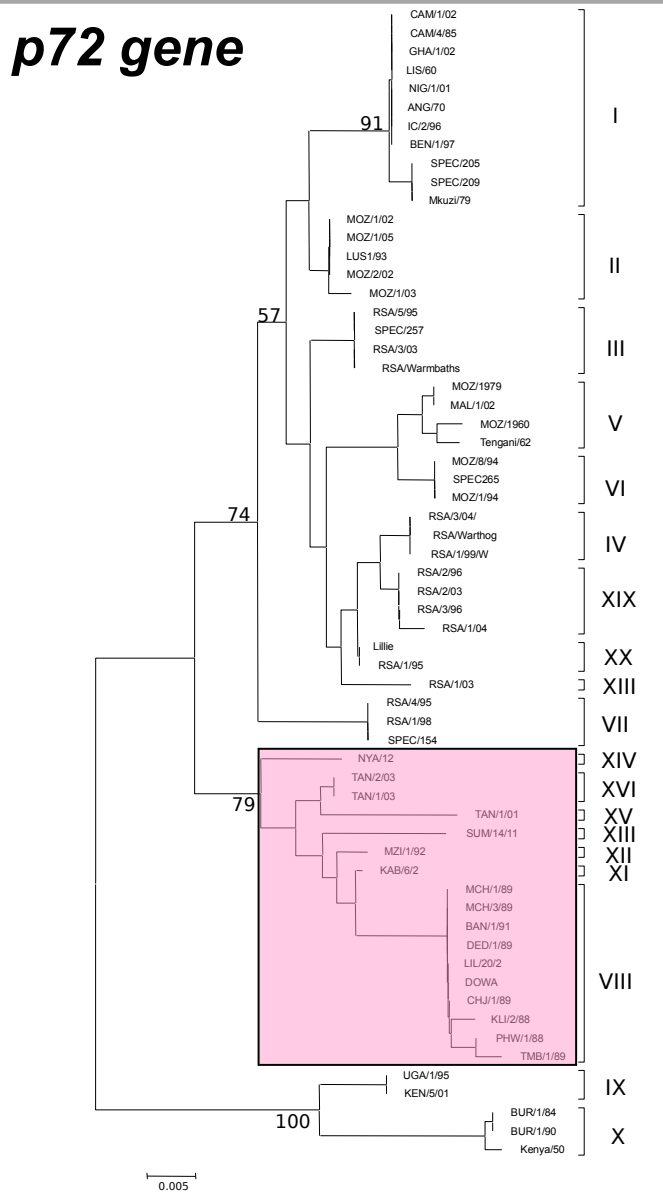

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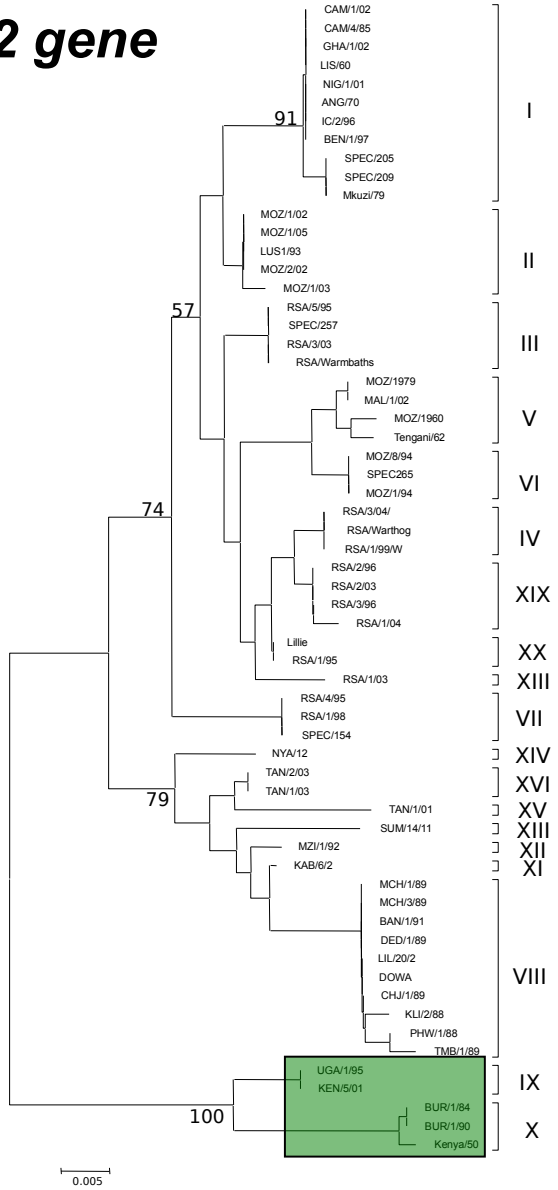

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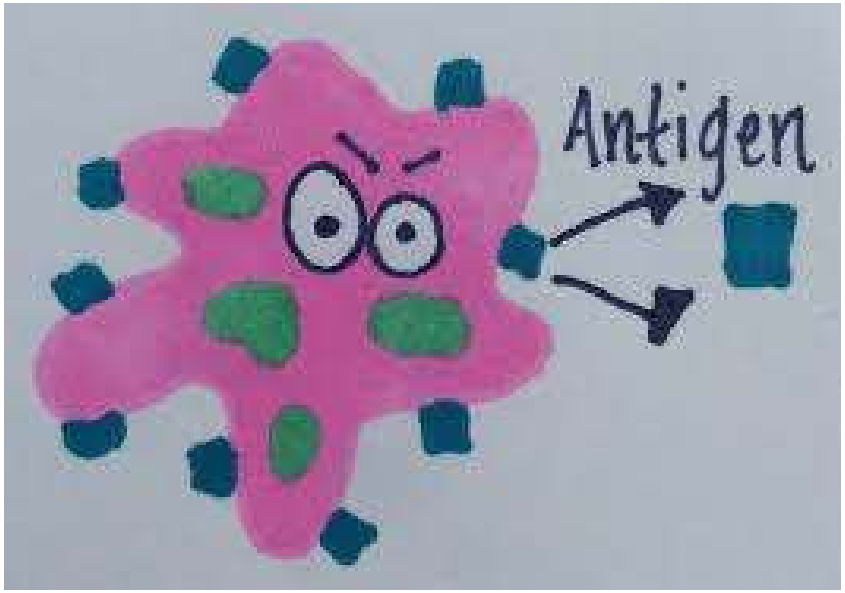
Vaccine development

- identify and try subunit viral proteins eliciting immune reaction
- get an attenuated, safe virus as a vaccine candidate
- using modern genome editing (CRISR-Cas9 + synthetic biology)
- more diversity means different types of vaccine to be developed for Africa



Host genomics

- genes involved in the response of the pig to ASFV?
- why do some pigs seem asymptomatic?
- how come warthogs are unaffected by ASFV (natural reservoir)?
- can warthog genomics help us help the pigs?

The tick host

soft tick *Ornithodoros moubata*

- what is the life cycle of ASFV in the tick?
- can we disrupt it?
- Kapiti a great sampling field!
- establishing new tick lines (Naftaly)

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ILRI scientists in the picture

They helped get this pitch – or would get involved in such a project, isn't it?
Too many to name them all!

- Jean-Baka Domelevo Entfellner
- Vish Nene
- Edward Okoth
- Sam Oyola
- Lucilla Steinaa
- Emily Ouma
- Naftaly Githaka
- Raphael Mrode
- Christian Tiambo
- Roger Pelle
- Hussein Abkallo
- Anna Lacasta
- Elise Schieck
- Nicholas Svitek
- Sonal Henson
- Nicoline de Haan
- Karl Rich
- etc…

- **YOU!!!**

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Patron: Professor Peter C Doherty AC, FAA, FRS
Animal scientist, Nobel Prize Laureate for Physiology or Medicine–1996

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