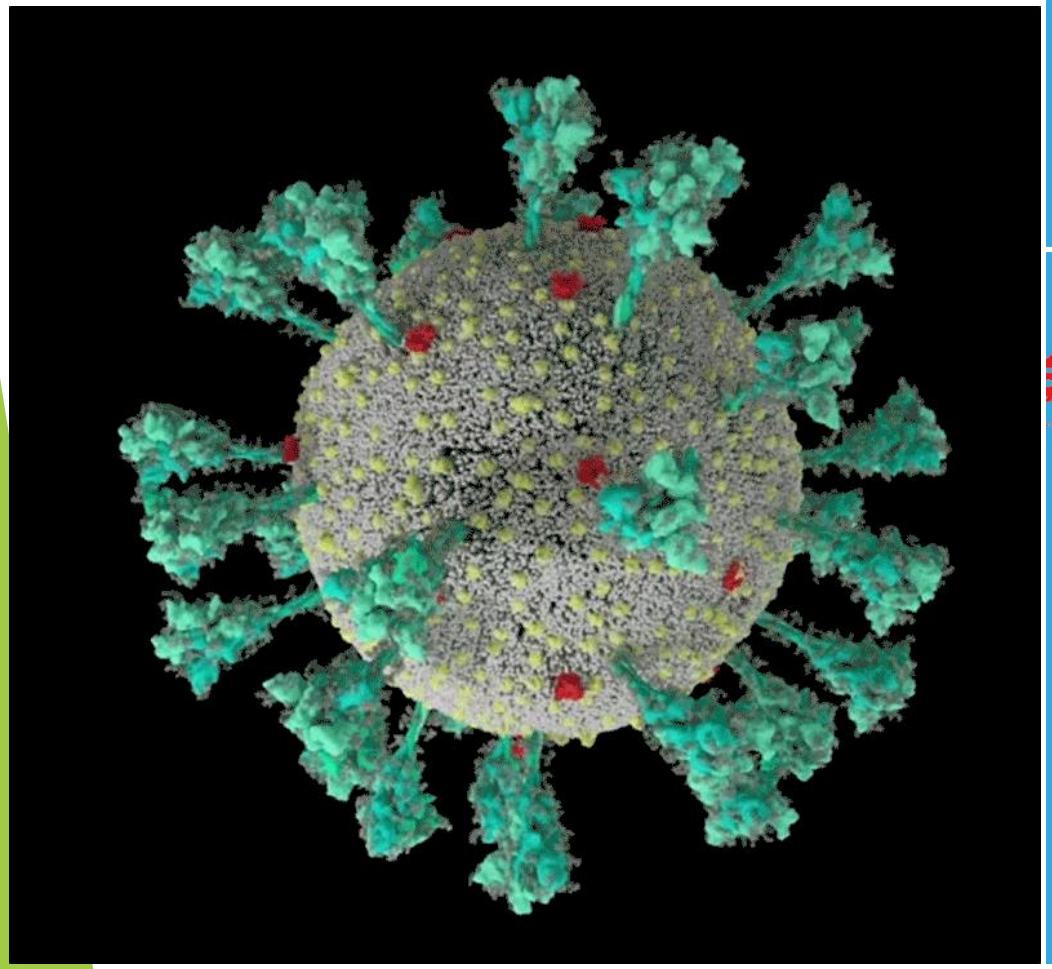
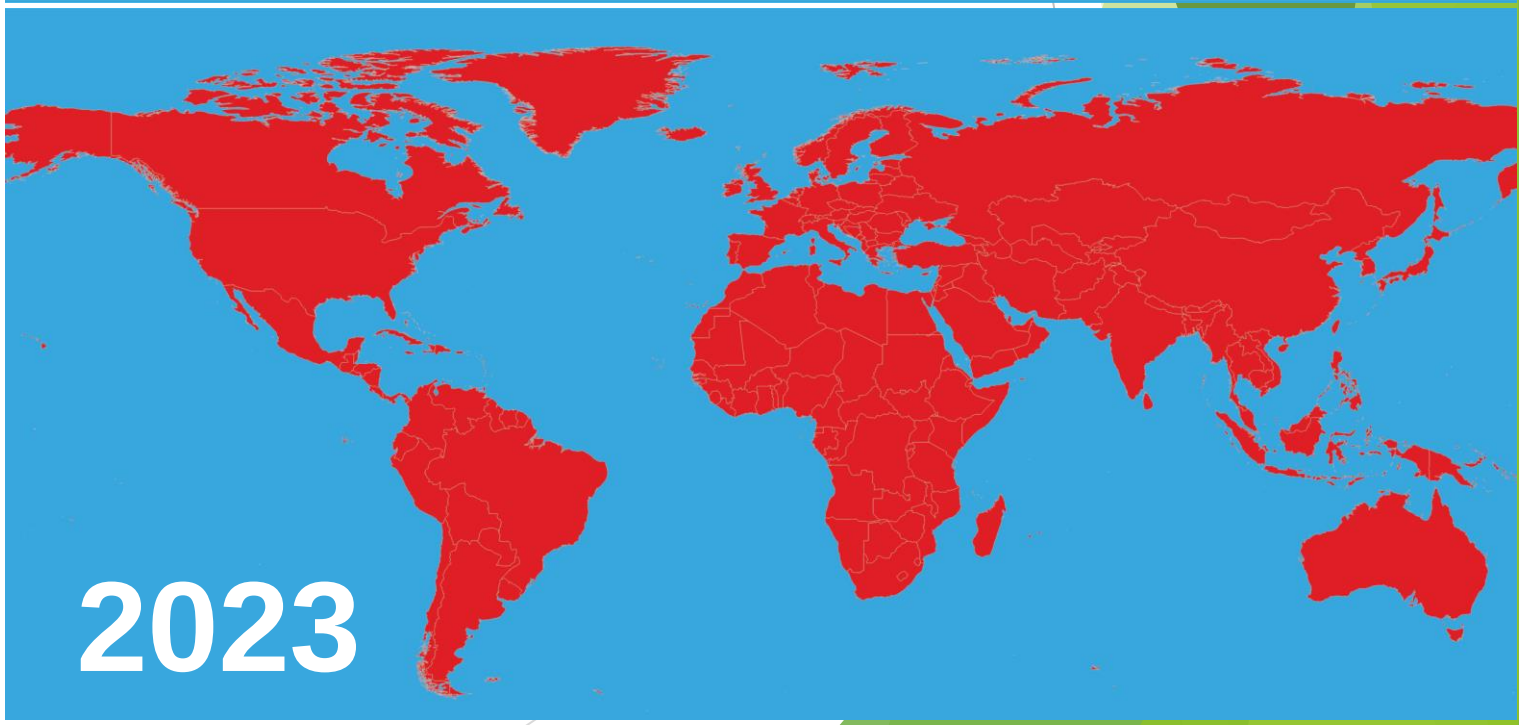
Understanding cross-border movements and spatial and temporal transmission of ASFV through molecular techniques

Gerald Misinzo

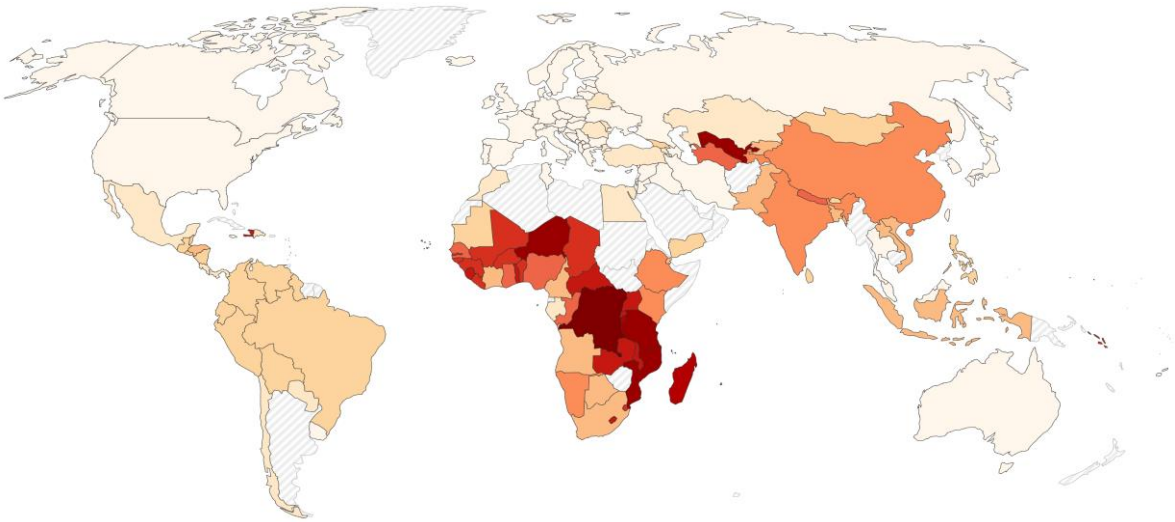
COVID-19



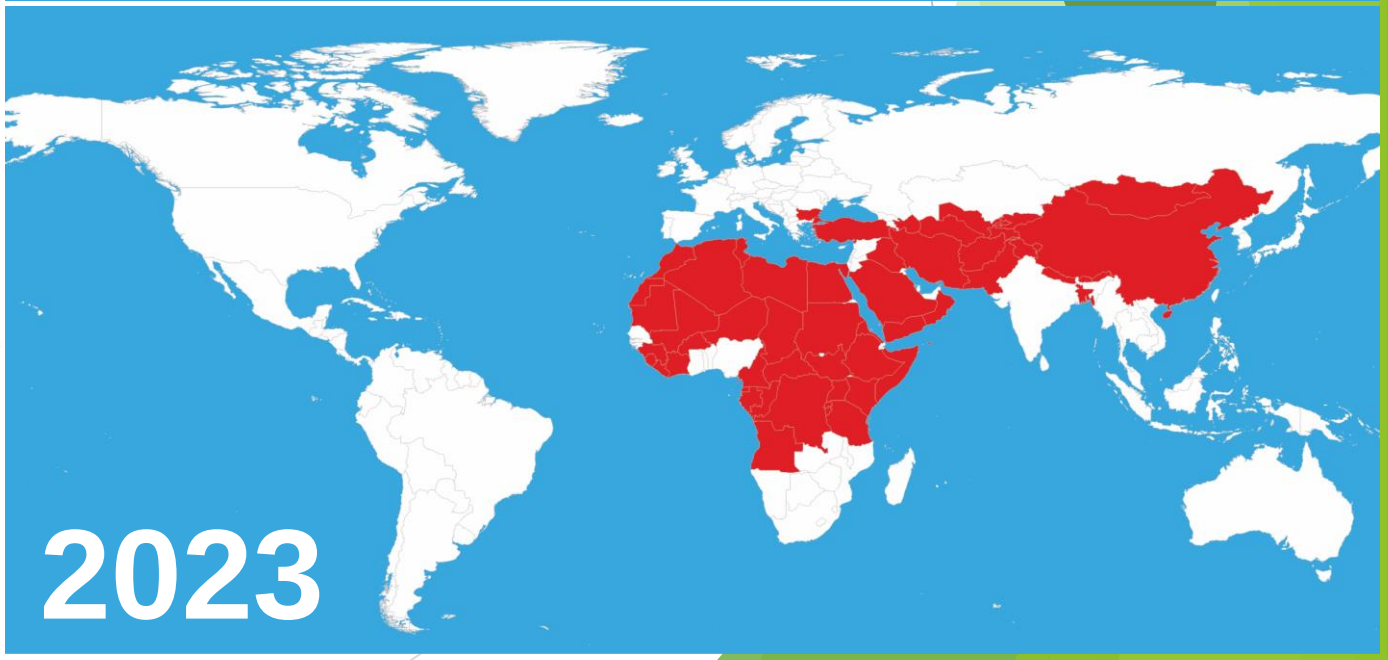


Peste des petits ruminants

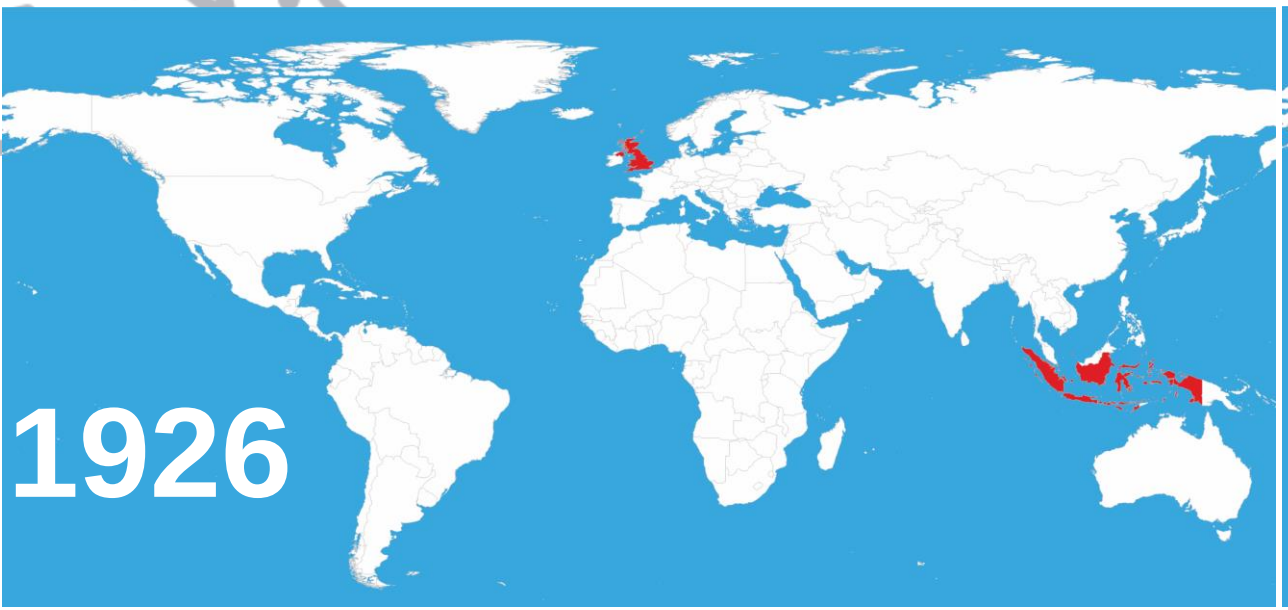
PPR eradication target: 2030

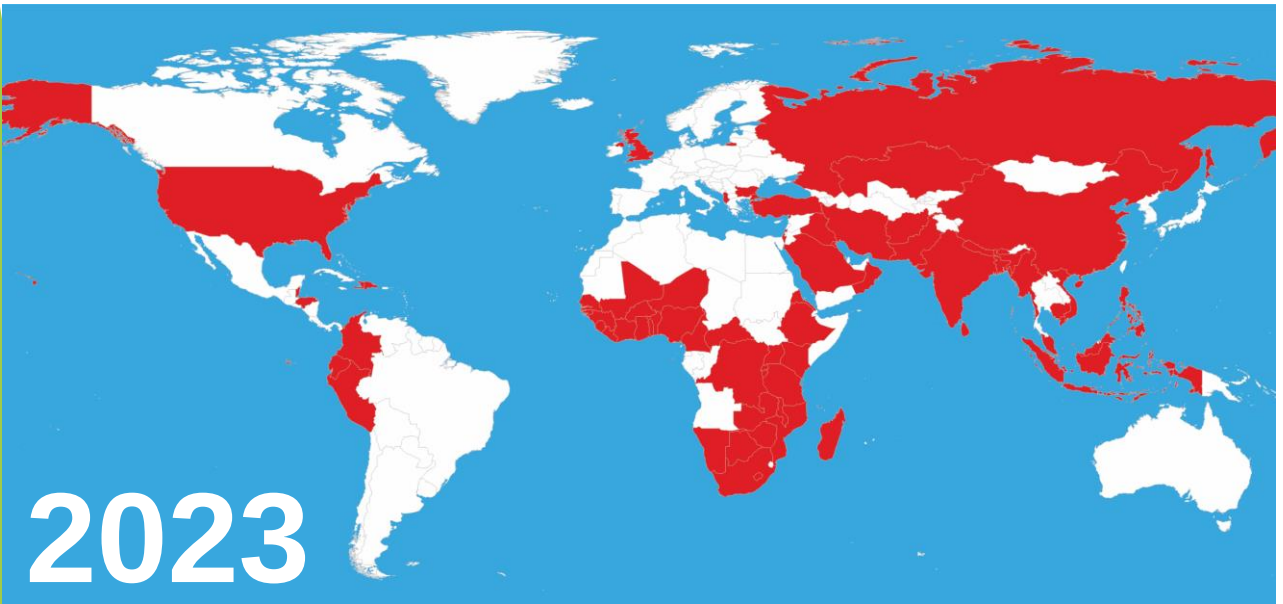


World poverty map

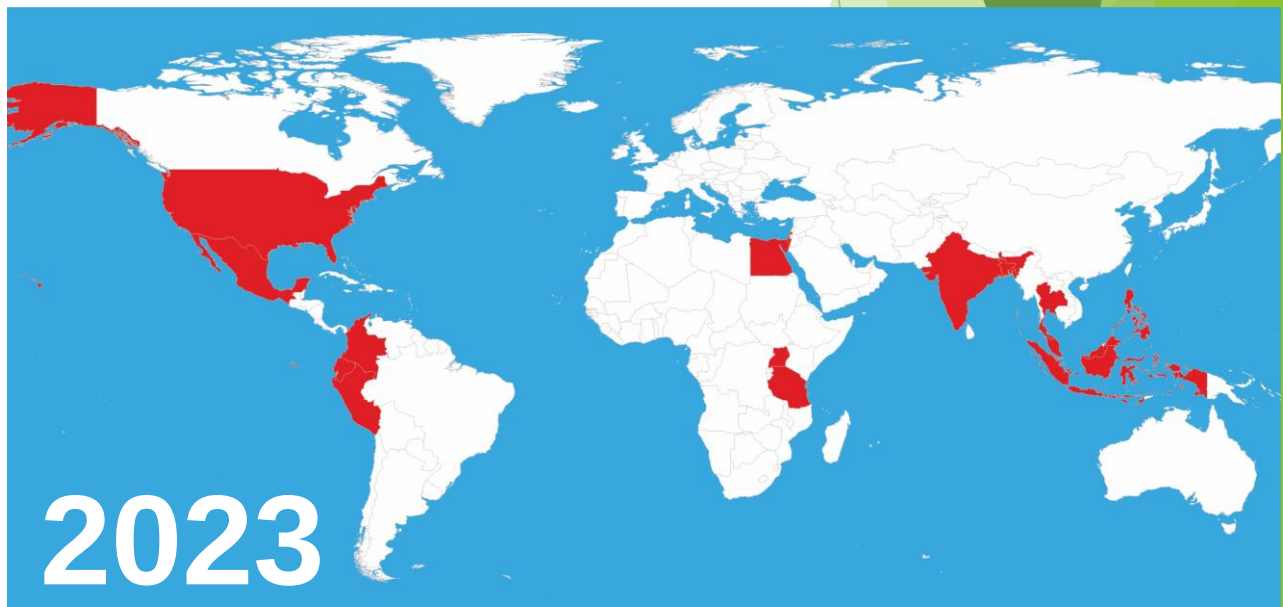


Newcastle disease





Tilapia lake virus disease



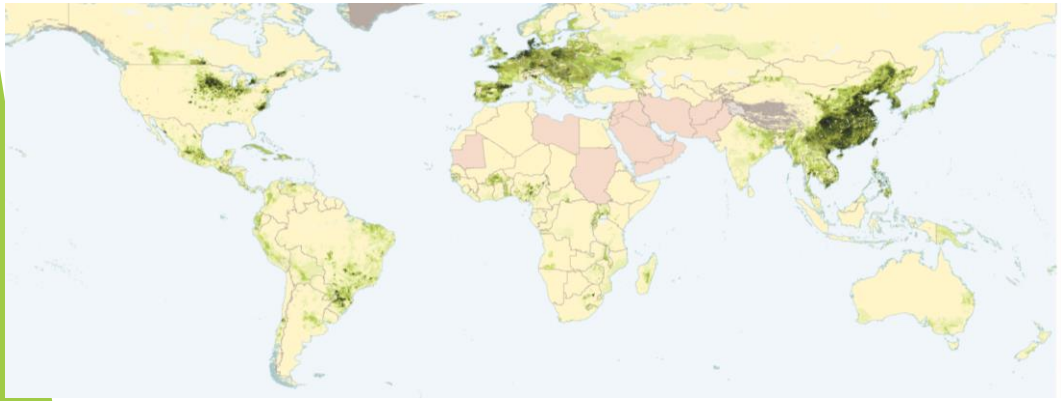
African swine fever

5,847,423

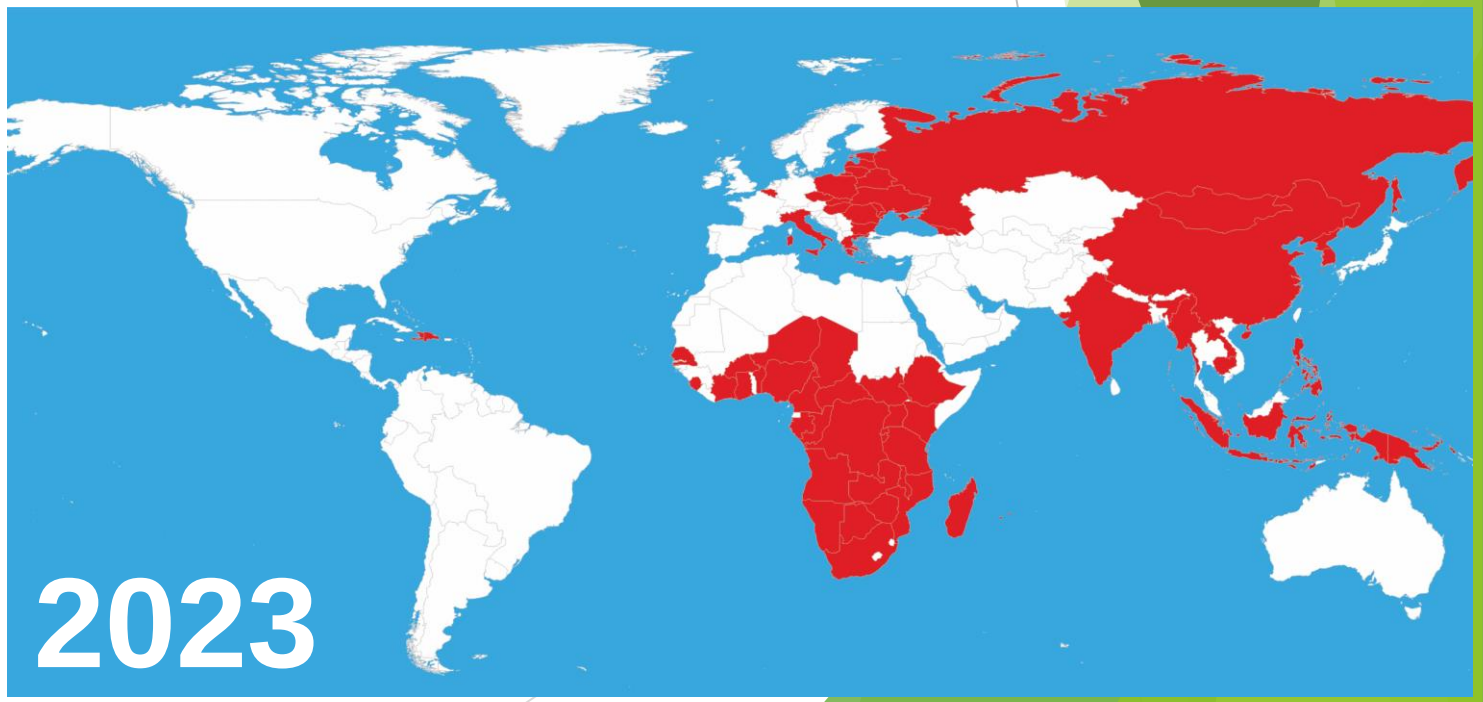
Denmark

13,400,000

1:2.3



Domestic pig population



Affordable Genomics

Oxford NANOPORE Technologies

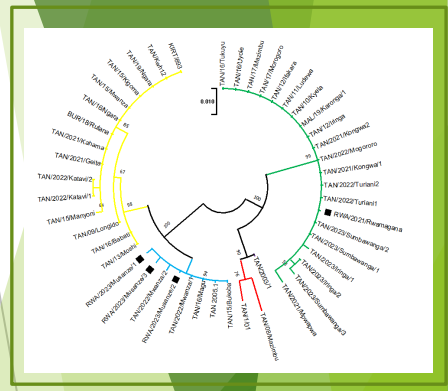
Early Detection and Identification

Syndromic surveillance

Mobile genomics laboratory

Sampling

On-site and laboratory next-generation sequencing

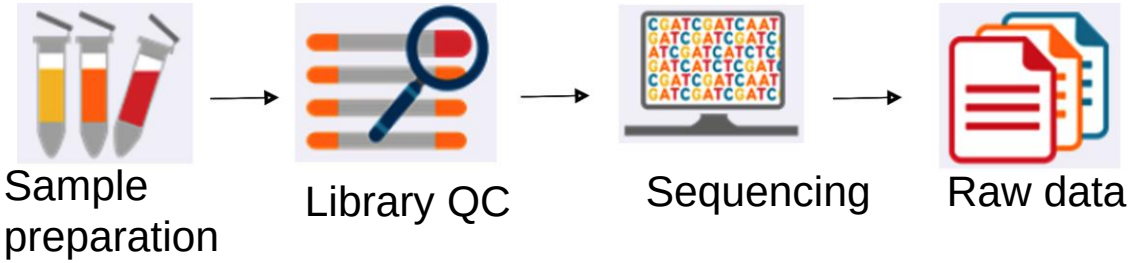


Diagnosis, pathogen identification and genotyping

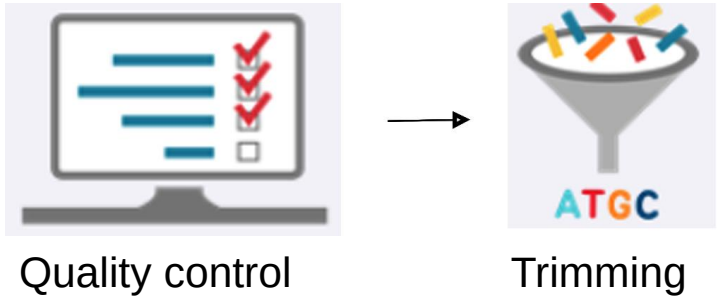
Detection at source

ASFV Complete genome sequencing and bioinformatics analysis: Illumina

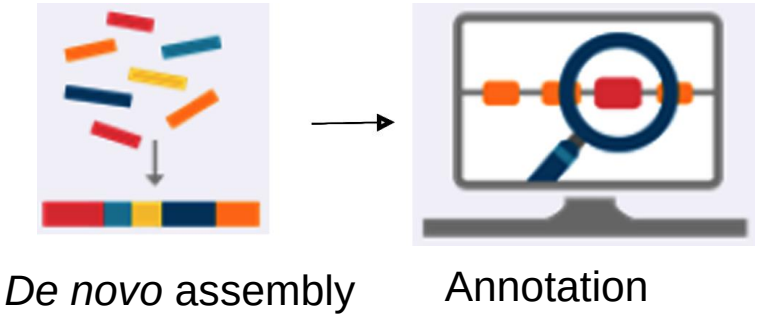
Sequencing



Preprocessing



Analysis

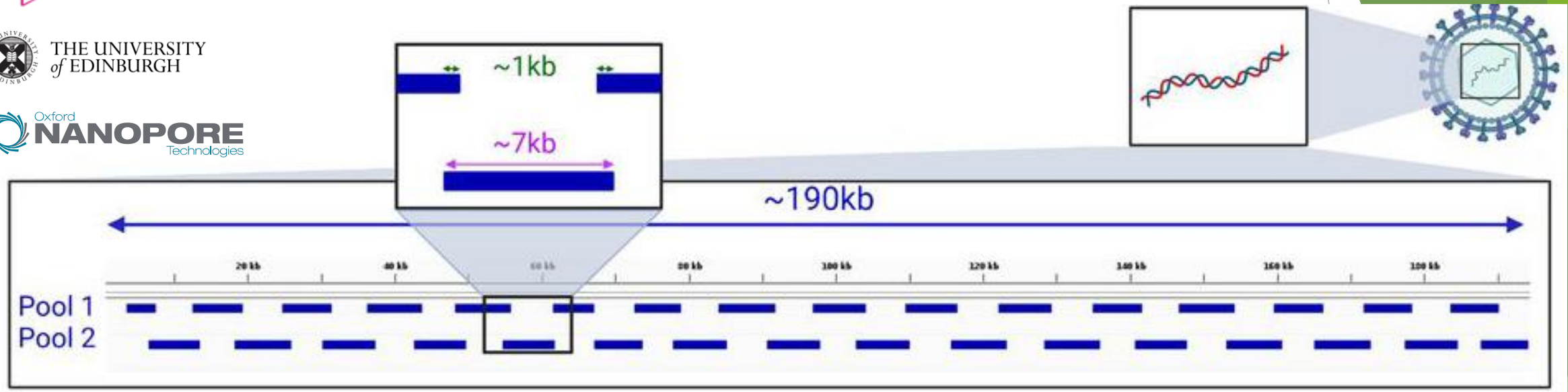


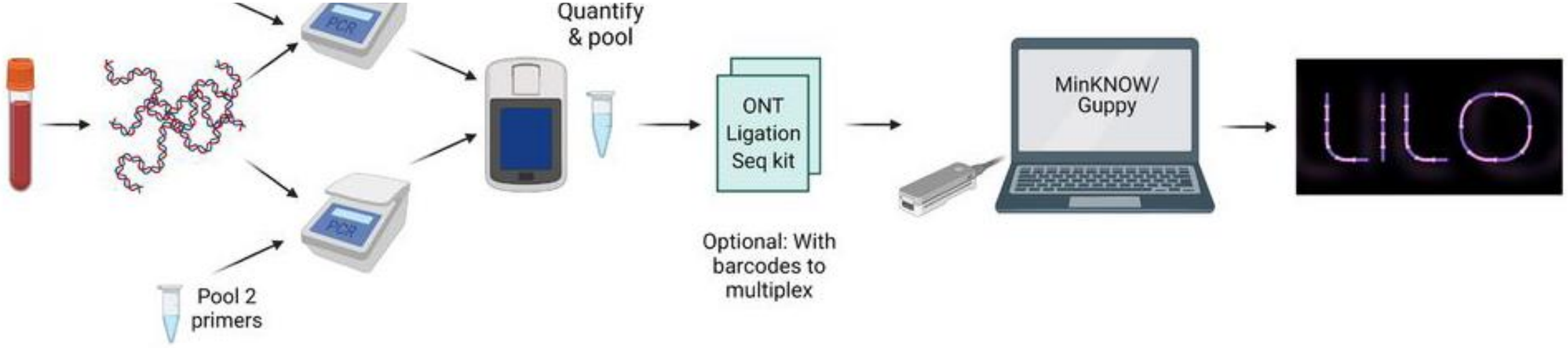
Tiled nanopore sequencing of whole ASFV genomes stitched together using LILO

ROSLIN

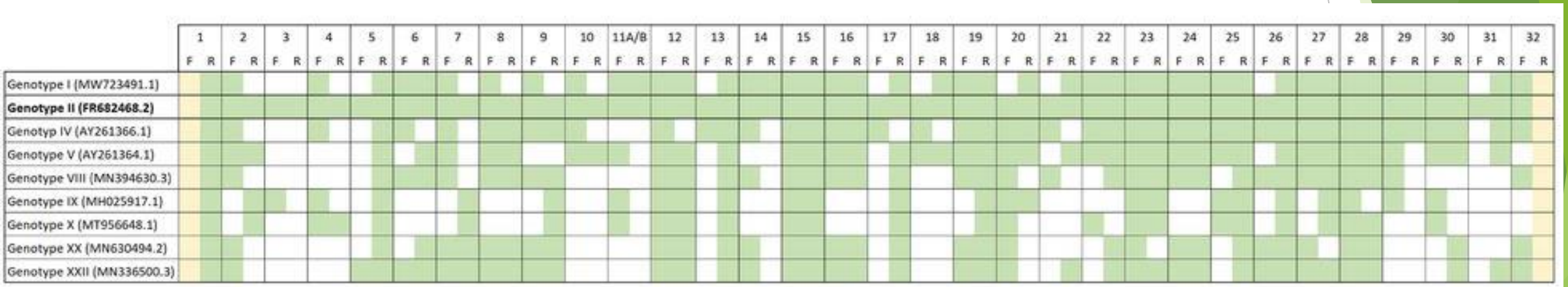
THE UNIVERSITY of EDINBURGH

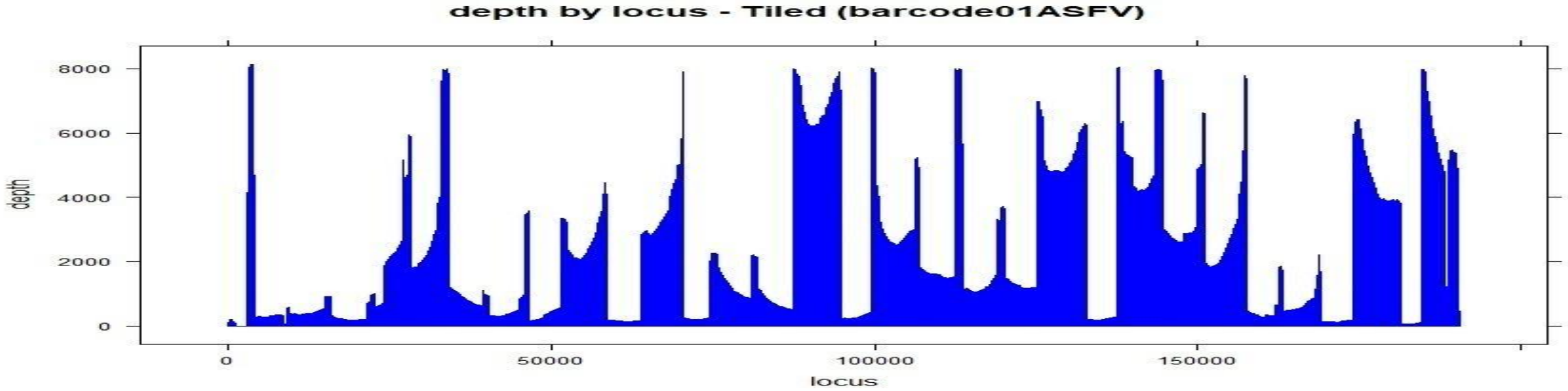
Oxford NANOPORE Technologies



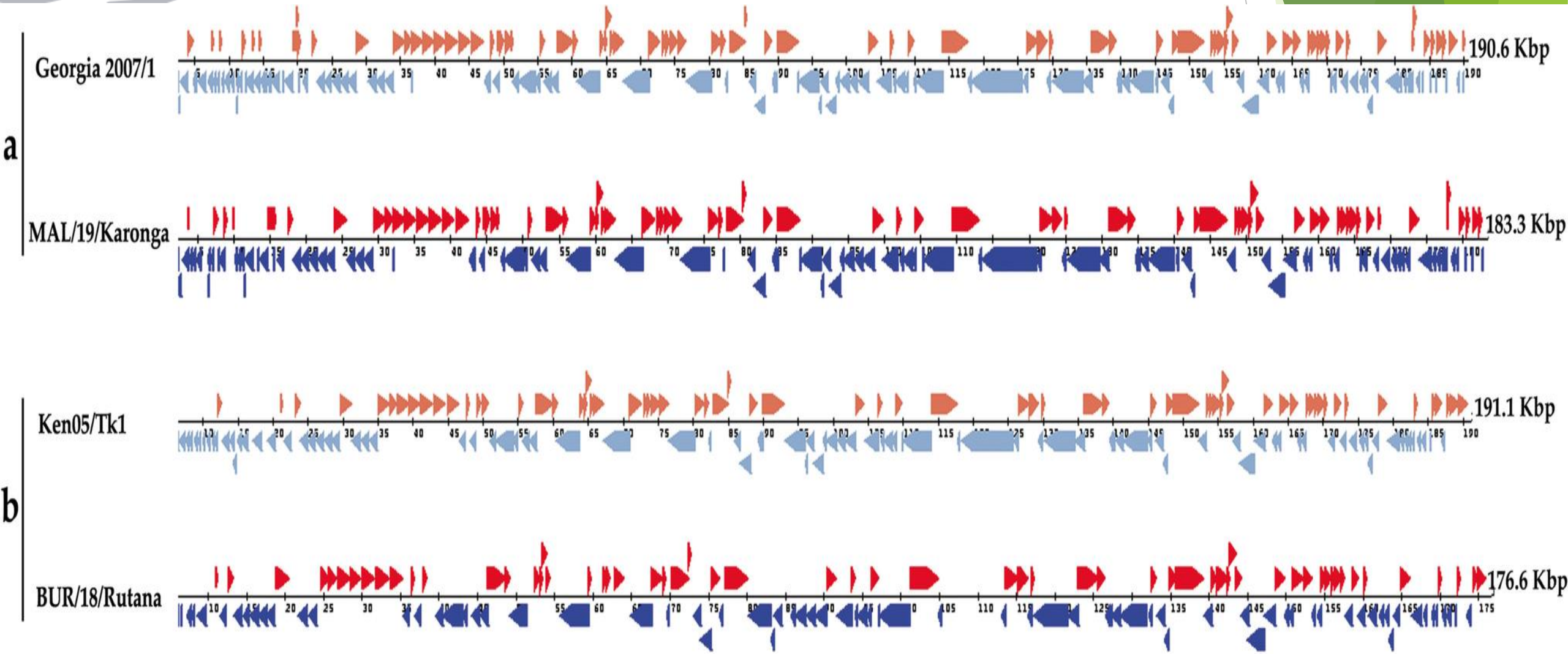


Tiled nanopore sequencing of whole ASFV genomes stitched together using LILO

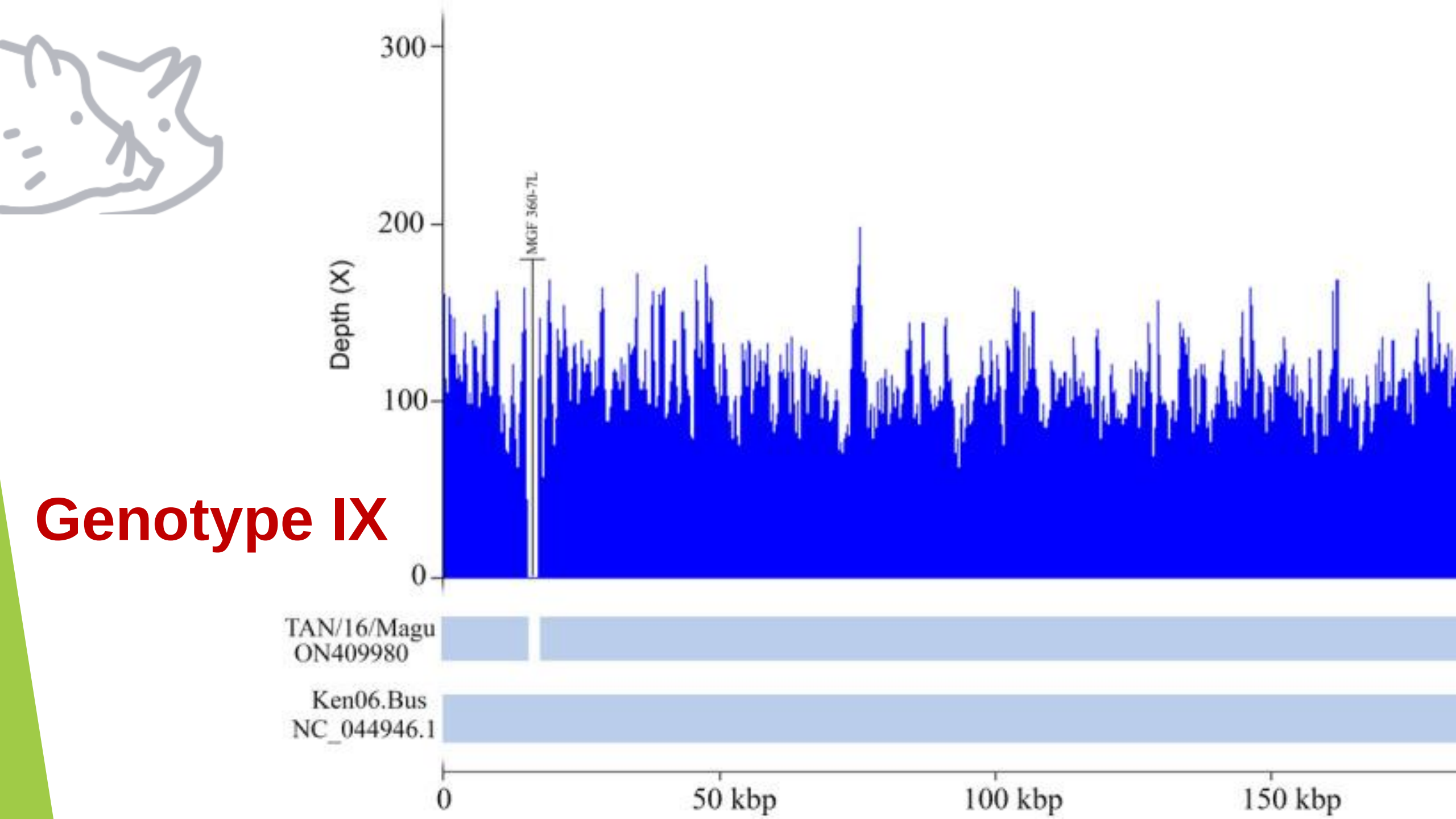




ASFV: Malawi (II) and Burundi (X)

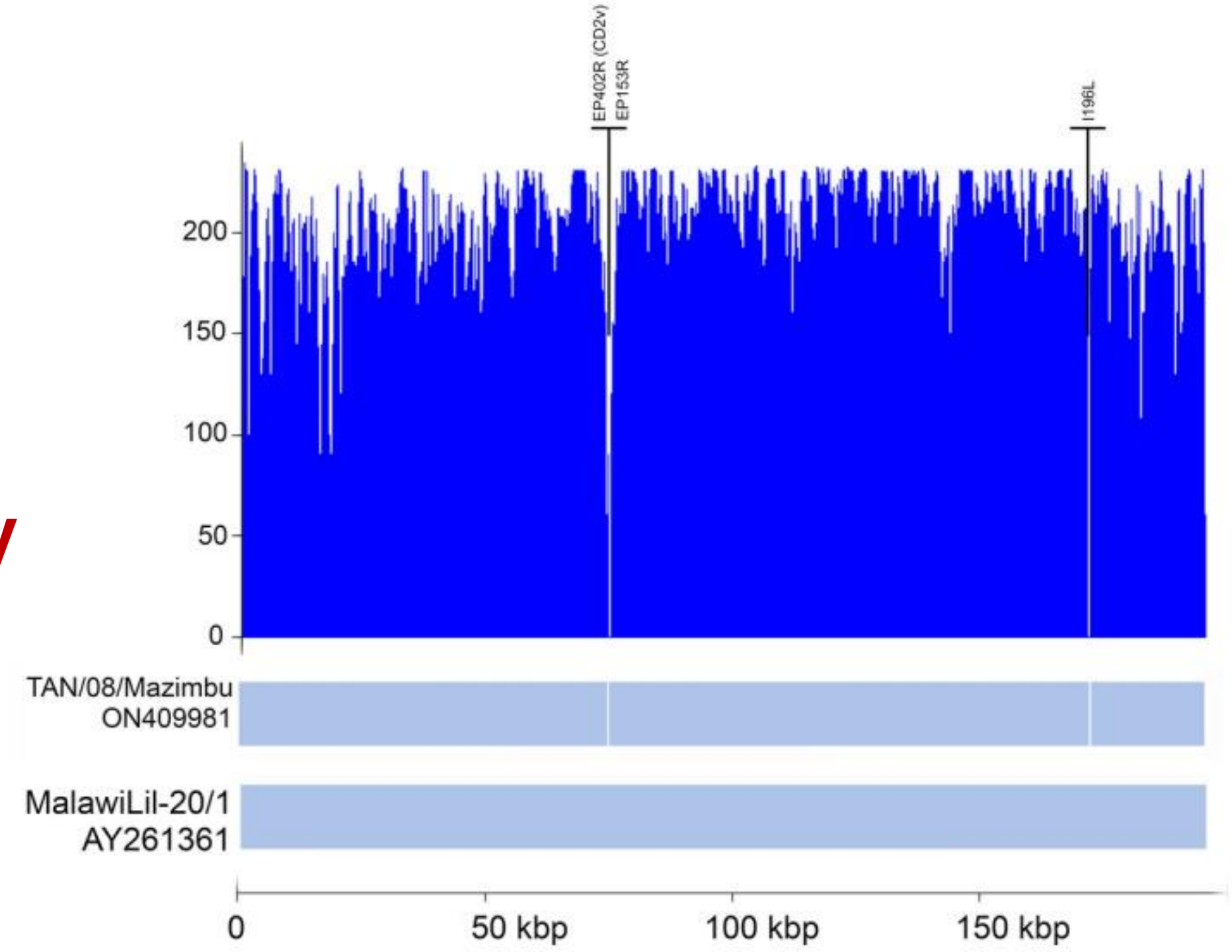


Genotype IX

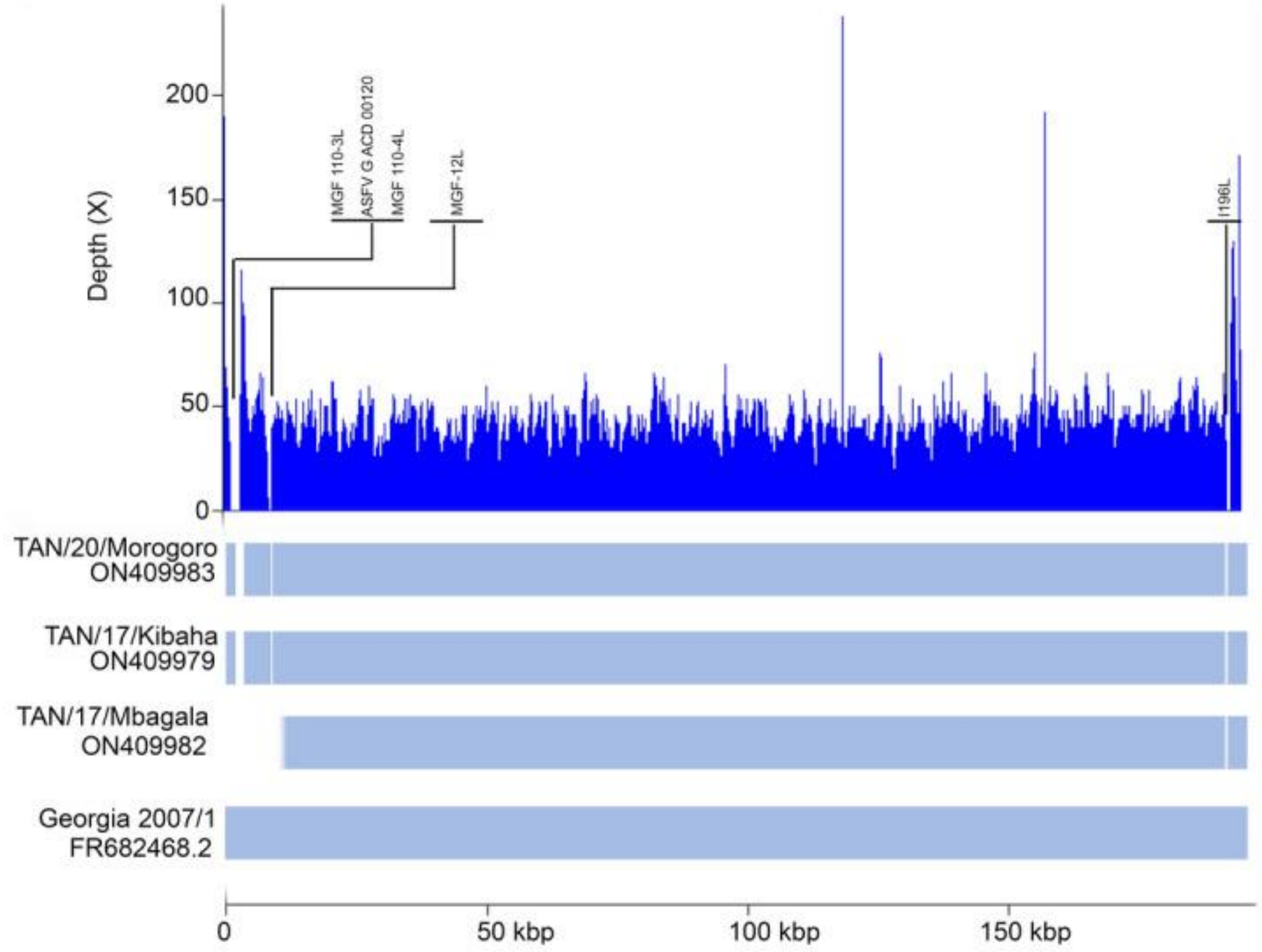

300
200
100
0
Depth (X)
MGF 360-7L
TAN/16/Magu
ON409980
Ken06.Bus
NC_044946.1
0
50 kbp
100 kbp
150 kbp

Genotype XV

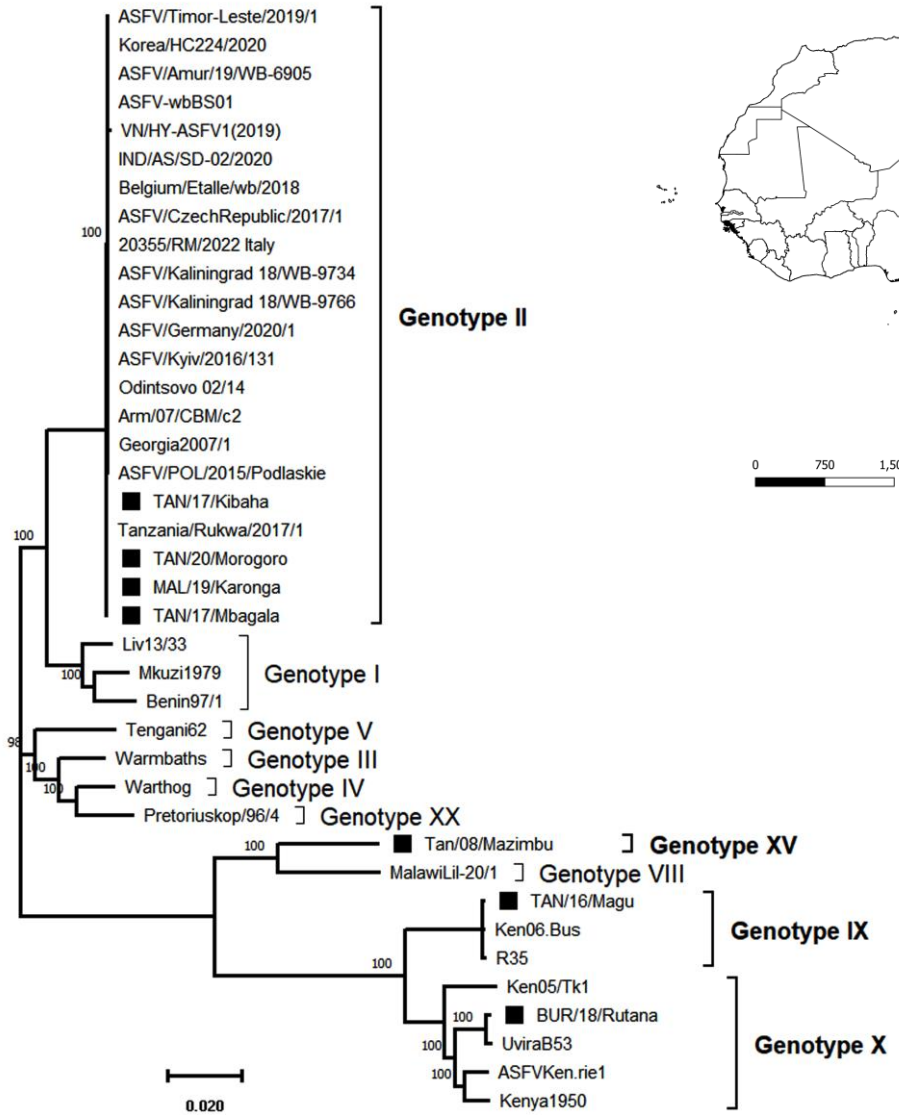
Genotype VIII



Genotype II


Depth (X)
200
150
100
50
0
MGF 110-3L
ASFV G ACD 00120
MGF 110-4L
MGF-12L
I196L
TAN/20/Morogoro
ON409983
TAN/17/Kibaha
ON409979
TAN/17/Mbagala
ON409982
Georgia 2007/1
FR682468.2
0
50 kbp
100 kbp
150 kbp

Complete genome analysis of the ASFV genotypes II, IX, X and XV from Burundi, Malawi and Tanzania



First complete genome sequence of ASFV genotype XV

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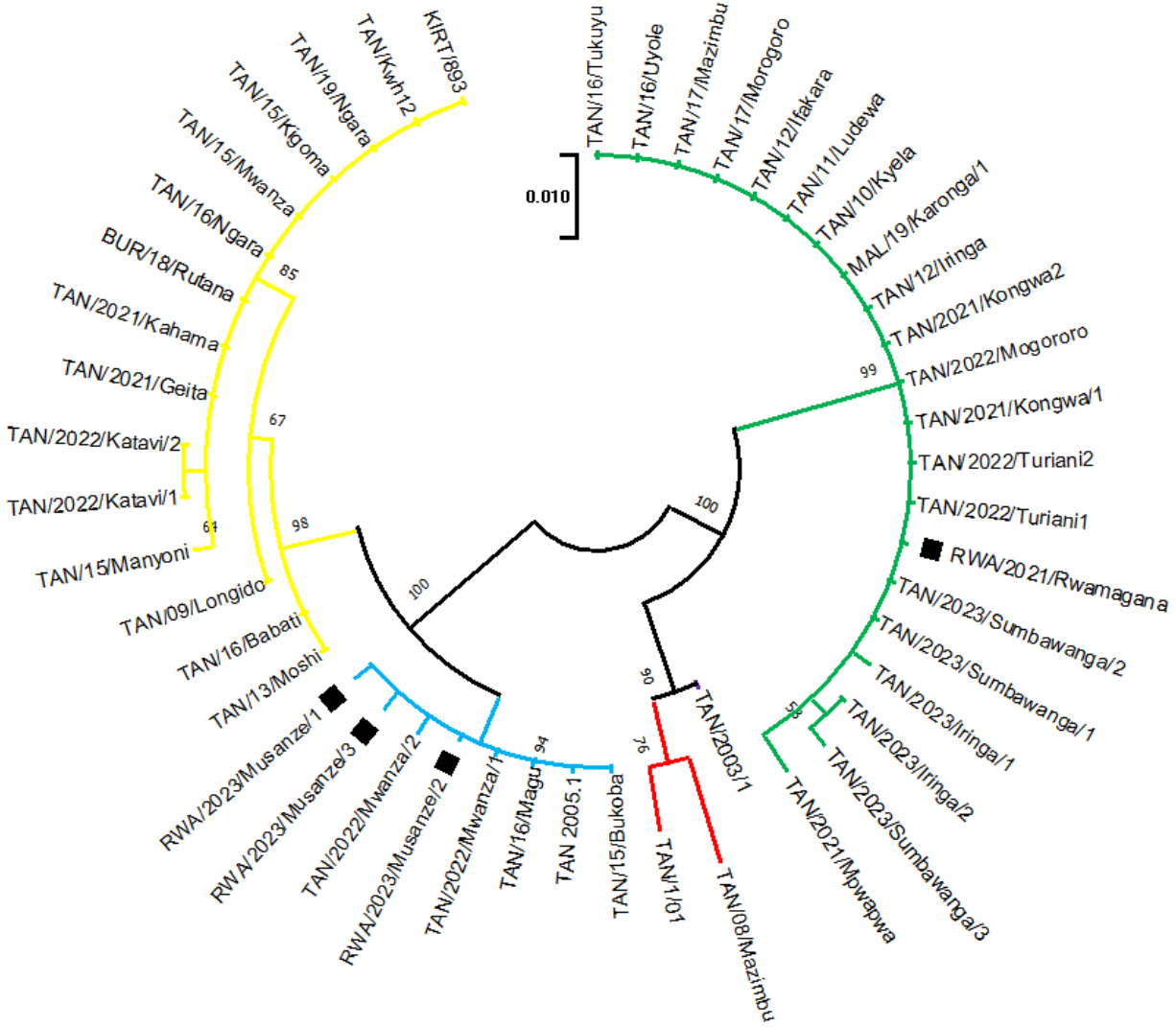
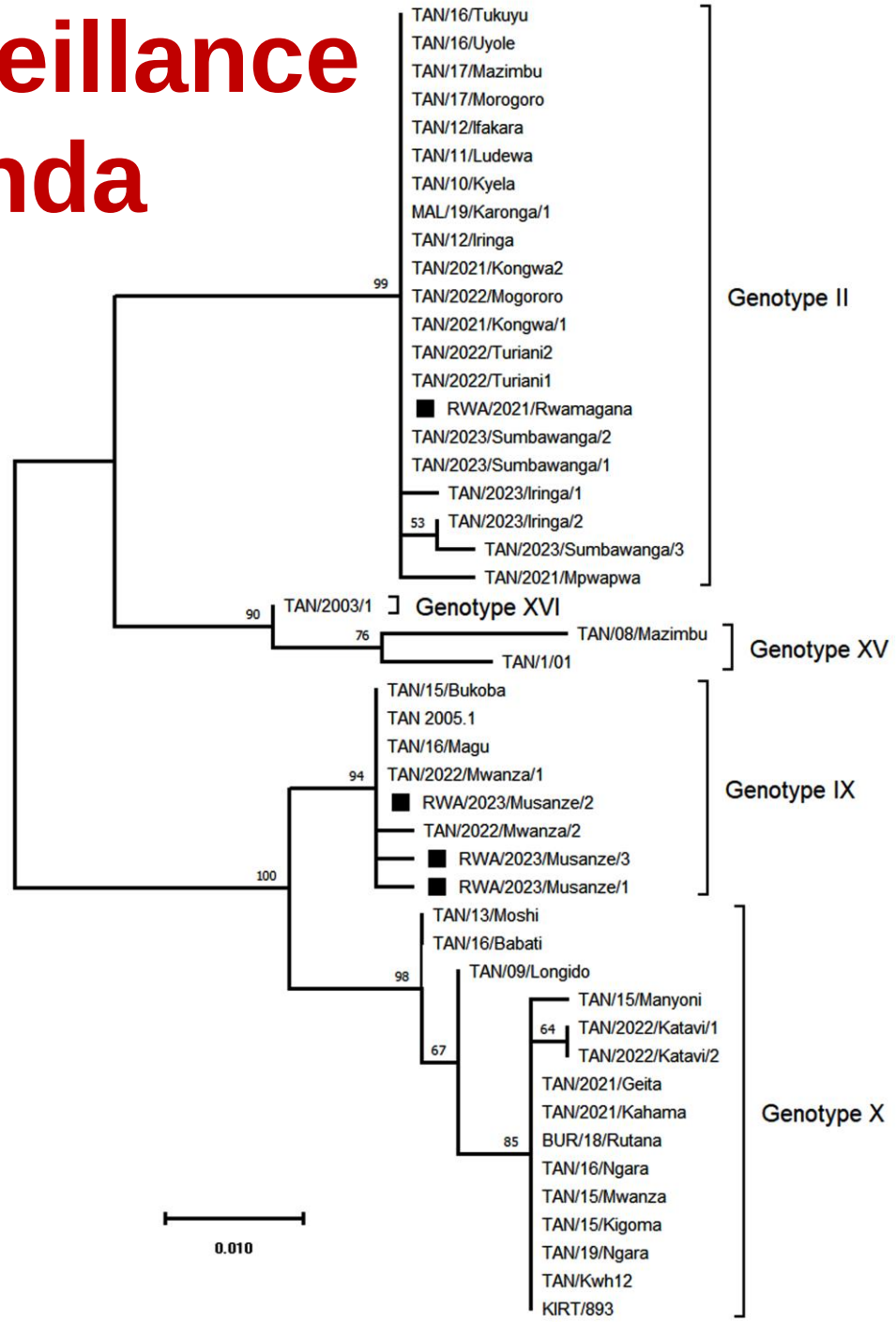
Complete genome analysis of African swine fever virus genotypes II, IX and XV from domestic pigs in Tanzania

Jean N. Hakizimana, Clara Yona, Mariam R. Makange, Ester A. Kasisi, Christopher L. Netherton, Hans Nauwynck & Gerald Misinzo

ASFV genomics surveillance in Tanzania and Rwanda

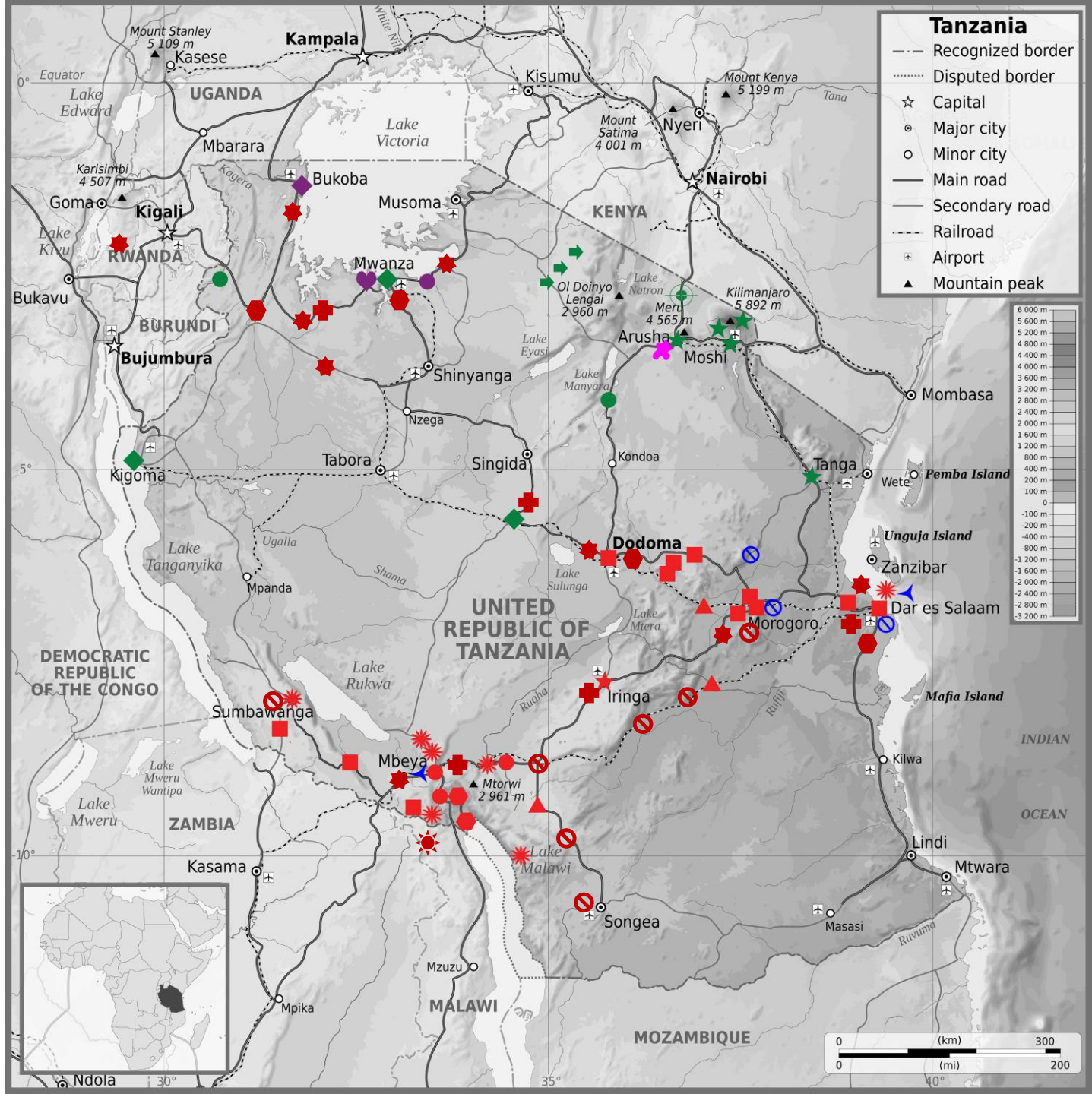




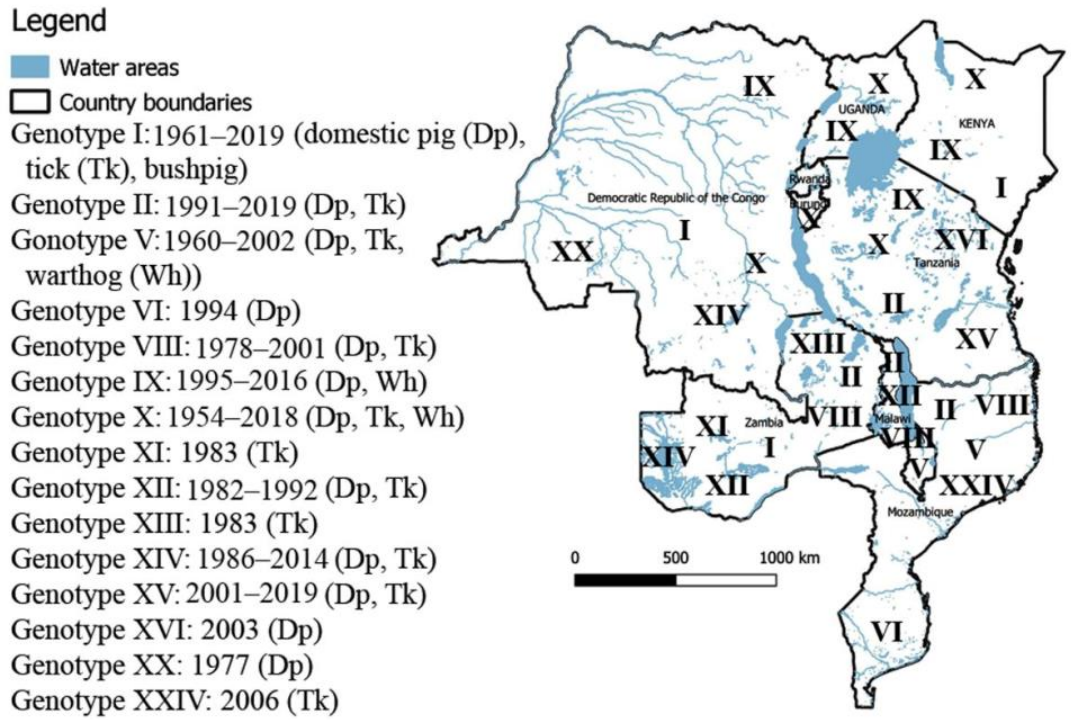
Genotype II

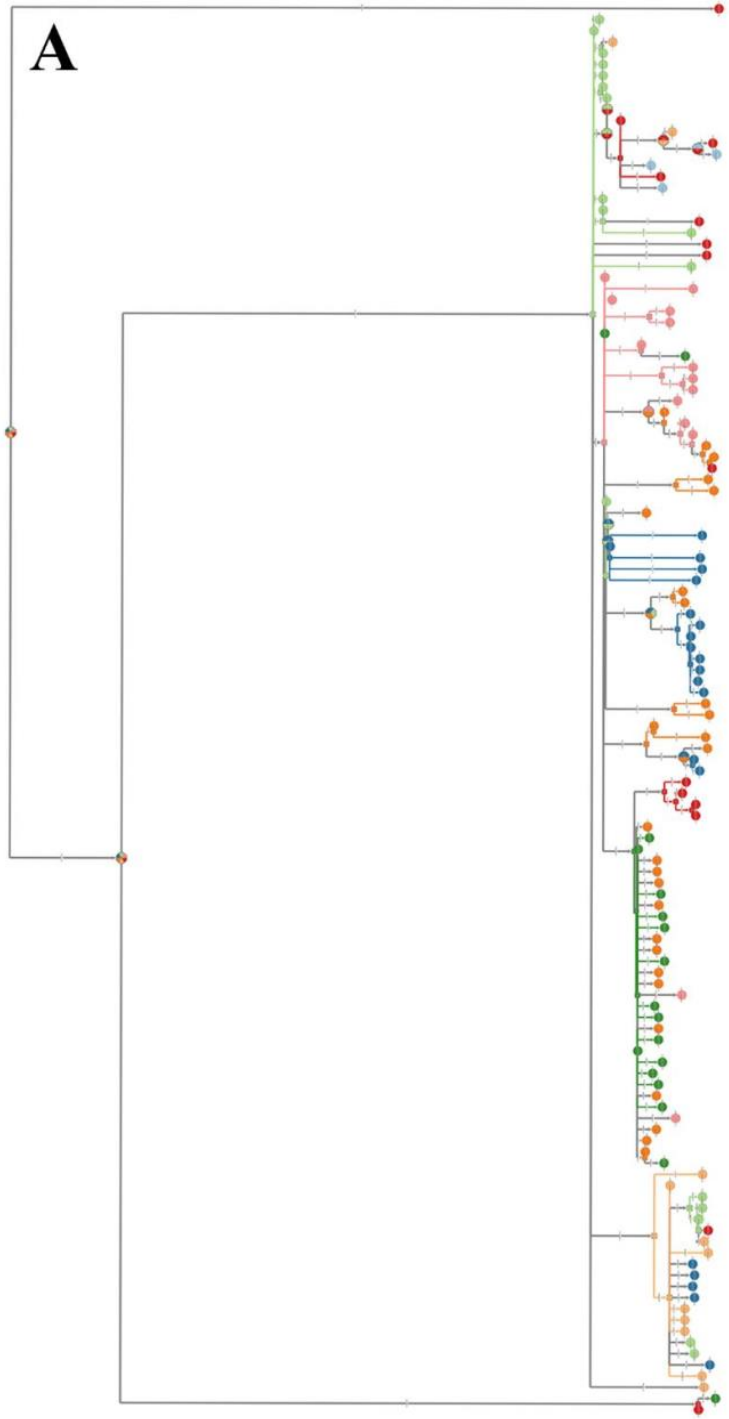
- Genotype II has gradually spread northwards and reached Rwanda in 2021.
- Chances are, it will be introduced to DRC, Uganda, Burundi and Kenya

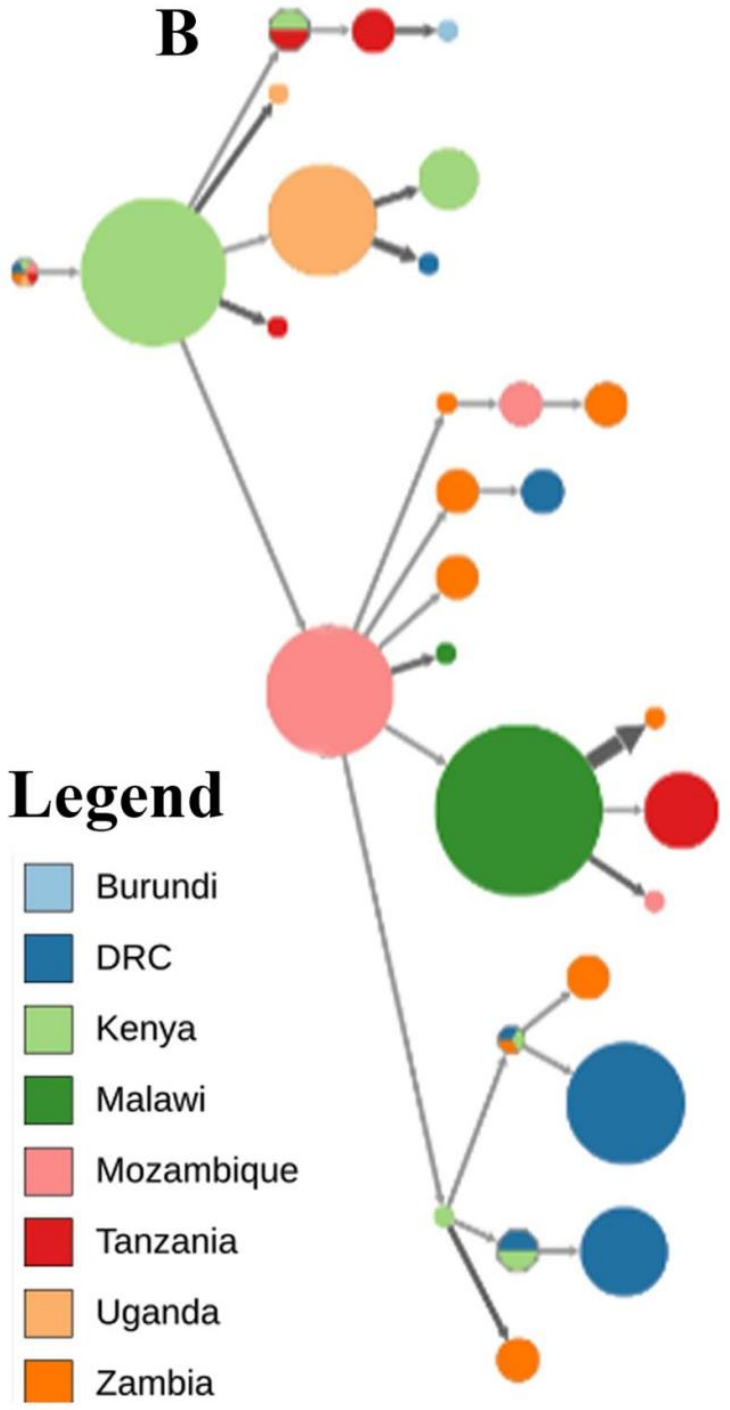
2011
2012
2013
2015
2016
2017
2020
2021
2022
2023



ASFV genotypes transmission dynamics







Key points

- Tracking and stopping genotype II incursion and dominance
- Understanding whether genotype II will enter the sylvatic cycle – ticks and wildlife
- Affordable genomics is possible in the African context
- Syndromic surveillance has to be coupled with genomic surveillance
- Continue with genomic surveillance to infer on the genomic changes (deletions and SNPs)

GF-TADs Africa

GLOBAL FRAMEWORK FOR THE
PROGRESSIVE CONTROL OF
TRANSBOUNDARY ANIMAL DISEASES

Food and Agriculture
Organization of the
United Nations

World Organisation
for Animal Health
Founded as OIE

African
Union