

# **Epidemiology of African swine fever in wild and domestic swine; factors for its persistence in Uganda**

Denis Muhangi (PhD Candidate)

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# African swine fever (ASF) overview

large DNA virus, genus Asfivirus (family Asfarviridae)

- Up to 22 genotypes
- OIE listed viral disease
- Acute, highly contagious in domestic pigs
- High mortality, reaching 100%
- No vaccines and no treatment
- Emerging trans-boundary disease
- Endemic in large parts of SSA including Uganda
- Pigs are increasingly becoming a source of income for small holders (poverty reduction) as demand for pork increases.
- ASF a constraint in development of the pig industry.



# Epidemiology

- Clinical disease\_domestic pigs (Pig-pig cycle)
- Wild boars (Europe) and the Caucasus
- Sylvatic cycle- Warthogs, soft ticks (Ornithodoros moubata).
- Other wild suidae- bush pigs, giant forest hogs.



# Objectives:

## Main Objective:

Provide information on epidemiology of ASF in Uganda & factors for its persistence.

## Specific objectives:

- (1) Investigate the dynamics of transmission of ASF in domestic pig production systems.
- (2) Investigate the risk factors for ASF along the domestic pig value chain.
- (3) Assess the role of wildlife (wild pigs and soft-ticks) in transmission of ASF.
- (4) Assessment of genetic variability of ASF virus isolated from different hosts and places.

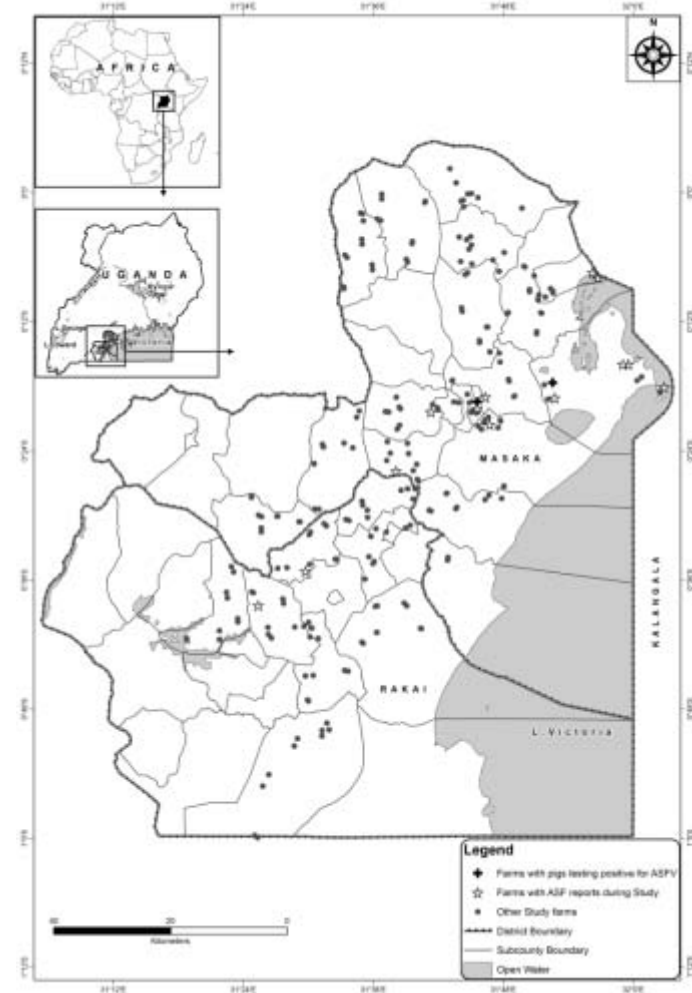


# Objective 1: Investigating dynamics of transmission of ASF in domestic pig production systems.

- Study area: Masaka and Rakai
- Questionnaire survey and blood/serum samples from pigs

## Findings

- Risk factors; Feeding swill & getting replacement stock from other farms
- High incidence rate (14.1/100pig farm years)
- No evidence of long-term domestic pig carriers.

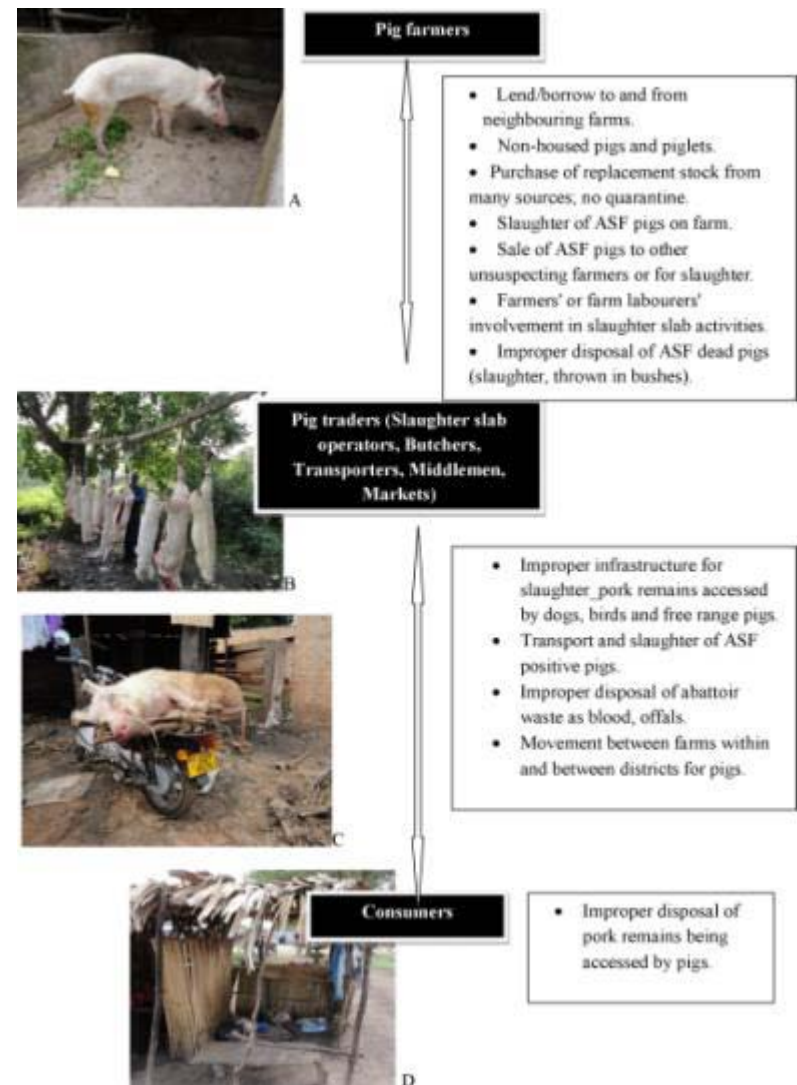


# Objective 2: Investigate the risk factors for ASF along the domestic pig value chain.

- Study area; Soroti, Tororo, Kabarole, Mityana, Mukono
- Study population; Pig farmers and pig traders (middlemen, butchers, roast pork restaurants)

## Findings;

- Existence of potential risk factors
- Poor infrastructure and ASF control/prevention mechanisms at district level.



# Objective 3: Assess the role of wildlife (wild pigs and soft-ticks) in transmission of ASF.

- Bush pigs work
- ELISA for antibodies against soft tick  
Ornithodoros moubata in sera of domestic and wild pig.





Unit sends GPS positions through GSM every 3 hours, and movements can be monitored online



Day	DxDriven	DriveTime	IdleTime	StartTime	StartAdr	EndTime	EndAdr
1	0.7	0	23	00:00	-0.052482/31.897233	23:00	-0.052047/31.896915
2	0.6	0	23	00:00	-0.052502/31.897037	23:00	-0.052465/31.896980
3	0.7	0	23	00:00	-0.052438/31.897315	23:00	-0.055910/31.896248
4	0.9	0	23	00:00	-0.055827/31.896288	23:01	-0.055853/31.896310
5	4.6	0	23	00:00	-0.055687/31.896395	23:00	-0.073168/31.883550
6	5.3	0	23	00:00	-0.077685/31.873548	23:01	-0.071100/31.915290
7	6.2	0	23	00:01	-0.071100/31.915290	23:00	-0.081880/31.888813
8	6.1	0	23	00:00	-0.078478/31.883970	23:00	-0.057300/31.894437
9	7.1	0	23	00:00	-0.072257/31.888152	23:00	-0.049675/31.890012
10	5.4	0	23	00:00	-0.051947/31.889037	23:00	-0.077387/31.883038
11	7.7	0	23	00:00	-0.075037/31.879435	23:00	-0.071128/31.887908
12	9.2	0	23	00:00	-0.078648/31.883703	23:00	-0.053198/31.888885
13	8.2	0	23	00:00	-0.071547/31.887855	23:01	-0.072113/31.913023
14	7	0	23	00:00	-0.071857/31.913282	23:00	-0.065400/31.889552
15	2	0	23	00:00	-0.056358/31.896765	23:00	-0.049343/31.890168
16	1.3	0	15	00:00	-0.049597/31.890150	15:01	-0.053323/31.897183
<b>Totals:</b>	<b>73 Km</b>	<b>0 hrs</b>	<b>360 hrs</b>				

Possible bush pigs-domestic pigs contact??



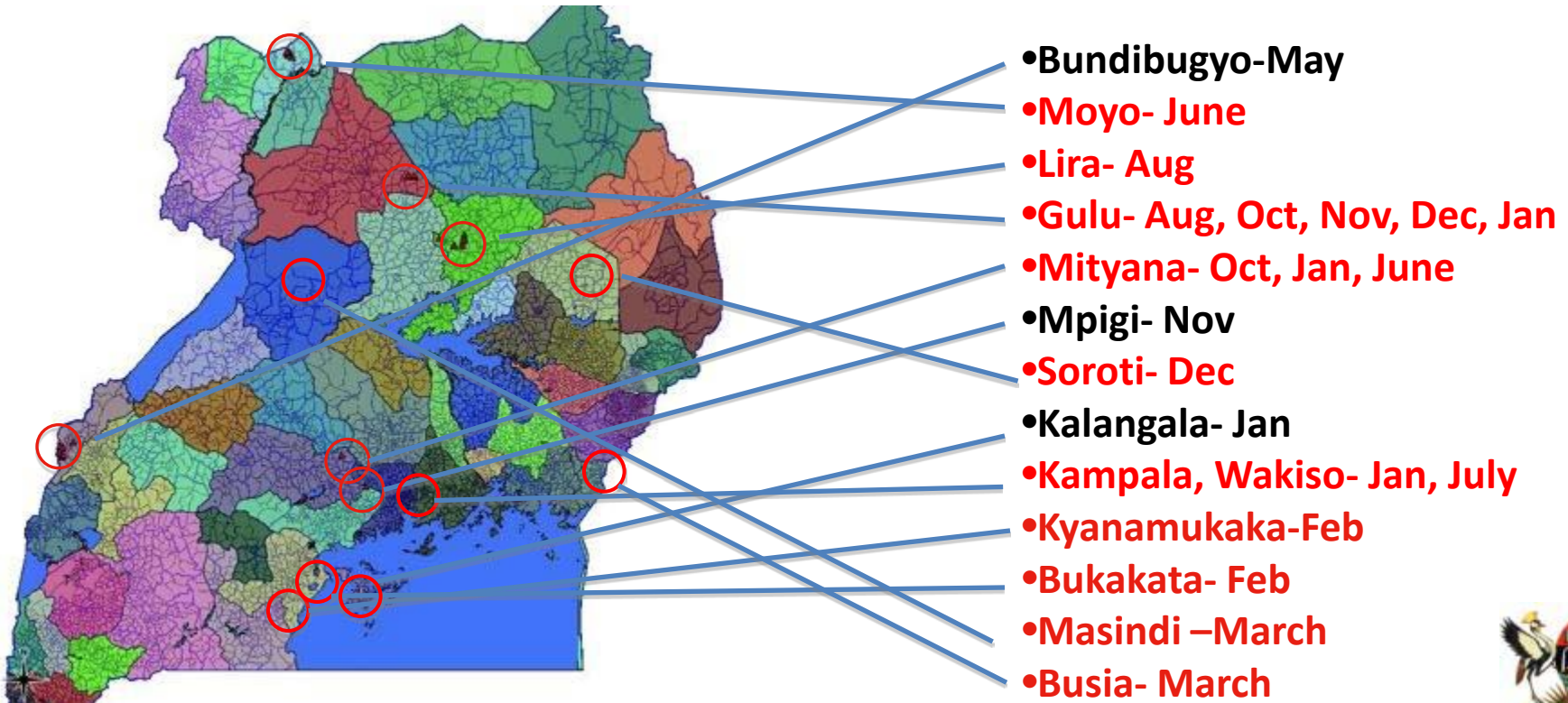


# Tick antibodies analysis

- Employs recombinant protein TSGP1, a salivary gland protein (Diaz-Martin et al, 2011).
- Results on inactivated sera at IRNASA, Spain (92 out of 500 samples or 18.4% from pig farms, slaughter slabs, outbreak samples, and wild pigs).
- High exposure to the soft tick vector.



# Objective 4: Assessment of genetic variability of ASF virus isolated from different hosts and places.



17 segregating sites in the 8 haplotypes: (17/398; 8/32)

111222222233333  
81232666777901111  
16302367014026789

1 AG5 CATT--ACCGACCGAGA  
2 AKL1\_1 .-.....  
3 BOB3\_2 ....C.....  
4 Gul1.1 -...C.....T-AGAG  
5 Gul1.3 ....C.....TNNNN  
6 Gul4.4 ..--C..G-A.T.....  
7 Moy18. .-...C.....  
8 KLZ10. .--..AG...-T.....

74 segregating sites in the 33 haplotypes: (74/398)

1 1111111112 222222222 222222222 2233333333  
11235 5678888890 0122336990 0111222233 5556667778 8900111123  
1347909045 8730126810 3637090362 8024236958 3693670141 7028678902

1	BOB3_2	GCTCACGGTT	ACTACCATTTC	AATCTCACCC	CATGCCCCGC	CTT-ACCGAC	CCCCGAGAAC
2	AKL1_1	.....	.....	..-.....	.....	.....	.....
3	K02	.....	.....	.....	.....	.....	.....
4	Moy18.	.....	.....	..-.....	.....	.....	.....
5	KAS6.3	.....	.....	.....	.....	.....	.T.....
6	KIR10	.....	.....	.....	.....	.....	.T.....
7	Gul1.1	.....	.....	.....	.....	.....	T-.AGAGNN
8	KLZ10.	.....	.....	..-.....	.....	AG...-	.T.....
9	Gul4.4	NNNNNNNNN.	.....	..-.....	.....	...G-A..	.T.....
10	X_AY35	...TC.....	..AT..T...	G...CT..T.	.....	.....	TT.....G.
11	KEN05	.....	..A.....	G-..CT..T.	.....	.....	.....
12	X_AY35	.....	..AT.....	G...CT..T.	.....	.....	.T.T....G.

1. Fewer differences  
among UgASF across  
time and space

2. More differences btn  
Ug and the rest

13	XIV_AY	...T..AA.C	.T..A.G.G.	....ATG...	T....T.T..	....G....	.T.....T
14	XIII_A	...T..AA.C	.T..A.G...	....ATG...	.....	.C..G....	.T.....T
15	XV_AY4	...T..AACC	.T..ATG...	....ATG...	....TTT..	TC..G....	.T.T....T
16	XVI_AY	...T..A.C	.T..A.G...	....ATG...	....TT...	.C..G....	.T.....T
17	VIII_A	...T..AA.C	.T..A.G...	....ATG..T	....TT..	.C..G....	.T.....T
18	VIII_A	...T..AA.C	.T..A.G...	....ATG..T	....TT..	.C..G....	.T.....T
19	XII_AY	C..T..AA.C	GT..A.G...	....ATG...	.....	.C..G....	.T.....T
20	XI_AY3	...T..AA.C	.T..A.G...	....ATG...	.....	.C..G....	.T.....T
21	XII_AY	...T..AA.C	GT..A.G...	....ATG...	.....	.C..G....	.T.....T
22	VII_AF	...T..A.C	.T..G.G.G.	....AT...	.GG...T.TT	....G....T	.T.....T
23	XVIII_	...T..A.C	.T..G.G.G.	....ATG...	..G....T.T	.C..G....	.T.....T
24	V_AF30	...T..A.C	.T..G.GCGT	....AT.T..	..G....T.T	.C..G....	.T.T....T
25	VI_AF2	...T..A.C	.T..G.GCG.	...TAT.T..	..G.....T	.C..G....	.T.T....T
26	XVII_D	...T..A.C	.TG.G....	....ATG...	..G....T.T	....G....	.T.....T
27	I_AF50	...T.T.A.C	.TG.G.G.G.	....ATG...	..GA...T.T	....G....	.T.....T
28	II_AF2	..CT..A.C	.T..G.G.G.	....AT...	..G....T.T	....G....	.T.....T
29	XXI_DQ	.T.T..A.C	.T..G..G.	....AT...	..G.....T	....G....	.T.T....T
30	IV_AF4	...T..A.C	.T..G..G.	G...AT...	..G.....T	....G....	.TTT....T
31	III_DQ	...T..A.C	.T..G.G.G.	G...AT...	..G.....T	....G....	.T.....T



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