

Importance of the response plan in outbreak events

Use of transmission models to simulate the spread of livestock diseases

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Motivation ASF in Thailand

The Thai government approved 150 million baht (**USD 4.7 billion**) for the preparation for emergencies on a national level

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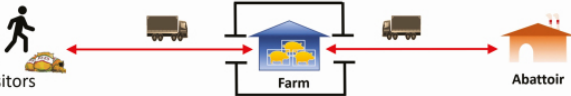
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 - Vehicles, tools, equipment, pigs, food, and feed from the ASF risk areas.

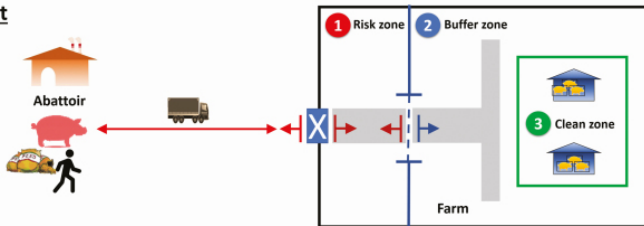
Motivation ASF in Thailand

The past

Movement of
vehicles, supplies,
equipment and visitors



At present



1. Restricting the movement of vehicles, supplies, equipment and visitors **at the entry zone** X
2. Implementing quarantine measures in the buffer zone
3. Creating the clean zone ① Risk zone ② Buffer zone and ③ Clean zone
4. Enhancing hygiene and awareness of the farm workers

Why to prepare against FADs?

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 - ❷ Eradicate the disease using strategies that seek to protect 1) animal agriculture, 2) food supply, and 3) the economy.
 - ❸ Provide science- and risk-based approaches to facilitate continuity of business.
- Achieving these three goals will allow individual livestock facilities, regions, and industries to resume normal production as rapidly as possible.

The objective is to allow the country/compartment/zone to regain disease-free status without the response effort *causing more disruption and damage than the disease outbreak itself*.

FAD preparation

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- 4 Pre-defined the best countermeasures.

Examples of FAD preparation

Secure Food Supply Plans are all about Continuity of Business.

- 1 Secure Poultry.
- 2 Secure Pork.
- 3 Secure Sheep and Wool.
- 4 Secure Milk Supply.
- 5 Secure Beef Supply.



What makes an SPS plan?

A completed Secure Pork Supply plan for a single site will display all 169 biosecurity features + map.

Written plan

Pirate Pork Farm Enhanced Biosecurity Plan for FAD Prevention in North Carolina

Date Created: 3/5/2021

This Biosecurity Plan is based off of the Secure Pork Supply (SPS) Self-Assessment Checklist for Enhanced Pork Production Biosecurity: Animals Raised Indoors, [August 2017] and was developed using guidance from the SPS Information Manual for Enhanced Biosecurity: Animals Raised Indoors. All documents are available at www.securepork.org. In the Plan below, all items have been implemented except those indicated which will be implemented prior to requesting an animal movement permit.

Scope of Biosecurity Plan

- National Premises Identification Number (PIN): 00XYZ12 Nursery
- Premises Address: 2468 Go Bulls Rd Durham, NC 28341
- Premises GPS Coordinates: 32.127481, -64.931797
- Animals* on primary premises: Swine and 2800
- Other business operations on premises? Yes
- If yes, what? Hay
- Secondary premises** locations:
 - Will be provided to Responsible Regulatory Officials if this premises is located in an FAD Control Area
 - *Work with your State Animal Health Official to determine if separate PINs are needed for all of your associated premises.

*Animals that are susceptible to FMD include cattle, pigs, sheep, goats, and elk. For biosecurity guidance for dairy cattle and beef cattle, see www.securemilksupply.org and www.securebeef.org.

**Work with your State Animal Health Official to determine if separate PINs are needed for all of your associated premises. When a premises becomes infected, all premises with the same PIN number will be considered to be infected.



Map view of the site



Standardized map view



Biosecurity > Biosecurity and Contact Tracing

Clear filters

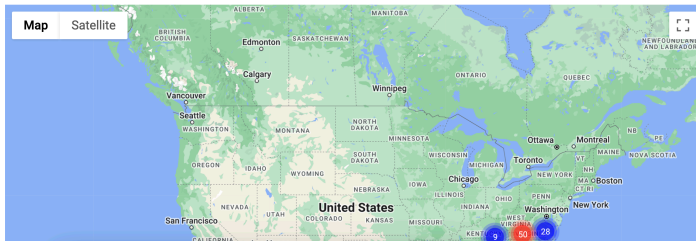
①

☐ Show Premise Movements

Zone 1 - Infected Zone 

Zone 2 - Buffer Zone

Zone 3 - Surveillance Zone



Disease transmission models as FAD
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- ➍ **One solution is to develop transmission model to simulate epidemics and the best control plan.**
- ➎ Do you know any other solutions?

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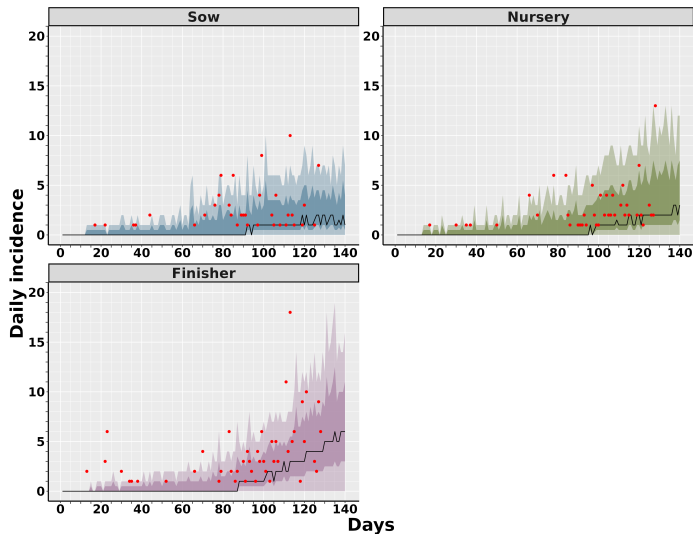
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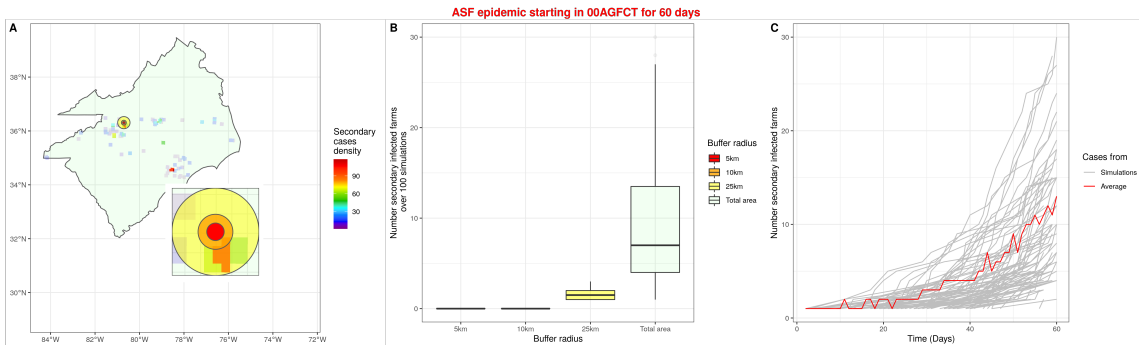
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4 Computation resources. 💻

Calibration models when we have past/current epidemic data



Simulation models, when we do not have any real data



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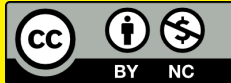
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 - ② Early in the infection, loads of uncertainty, do we need to wait for more data before calibrating a model for forwarding simulation?
 - ③ Late in the epidemic (can one wait)?
- ③ No published FMD transmission models for Latin America (MHASpread).

- Many countries rely heavily on mathematical simulation to make and update their policies. [2, 3]
 - New Zealand (InterSpread Plus).
 - U.S (InterSpread Plus and NAADSM).
 - U.K. (Exodis).
 - The Netherlands (The Netherlands model).
 - Denmark (DTU-DADS).
 - Australia (AADIS).
 - **Brazil (MHASpread).**
- Most of the cited models either are missing relevant data and realism (e.g. closed populations, single species, homogeneous mixing) or compromising complexity for speed (e.g time step in a week).

Thanks for listening

Questions?



References

- [1] “Estimating the effectiveness of control and eradication actions on African swine fever transmission in commercial swine populations in the United States”. In: (). DOI: *10.1101/2022.09.04.506538*. URL: *https://www.biorxiv.org/content/early/2022/09/08/2022.09.04.506538*.
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