

Drinker Biofilm Testing in Turkeys

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AgForte



Water is part of the influenza cycle.

Why test the water from poultry houses?

- The turkey industry checks birds for influenza antibody 21 days prior to market
- If they are antibody positive, what decisions need to be made?
 - Delay moving them?
 - Change the route by which they are moved?
- Are they even still shedding virus?
- Can virus then be found in the drinking water?
- Perhaps presence of flu virus in the water can help inform decisions of when and/or how to market



How can we check the water?

- **Antigen capture (FluDetect strips)**
 - Advantage: very quick assay
 - Disadvantage: May just be residual, non-infectious protein coats
 - Not very sensitive (10^3 to 10^4 EID₅₀)
 - Disadvantage: May pick up false positives just due to water chemistry
- **qRT-PCR of AI matrix**
 - Advantage: stronger evidence that influenza is in the poultry house
 - Advantage: better sensitivity (? 10^1 EID₅₀)
 - Disadvantage: Can detect non-viable virus
- **Isolation from eggs**
 - Advantage: Best sensitivity for presence of live virus
 - Disadvantage: time and cost of eggs
 - Disadvantage?: maybe too sensitive? Detects down to far below infectious dose?

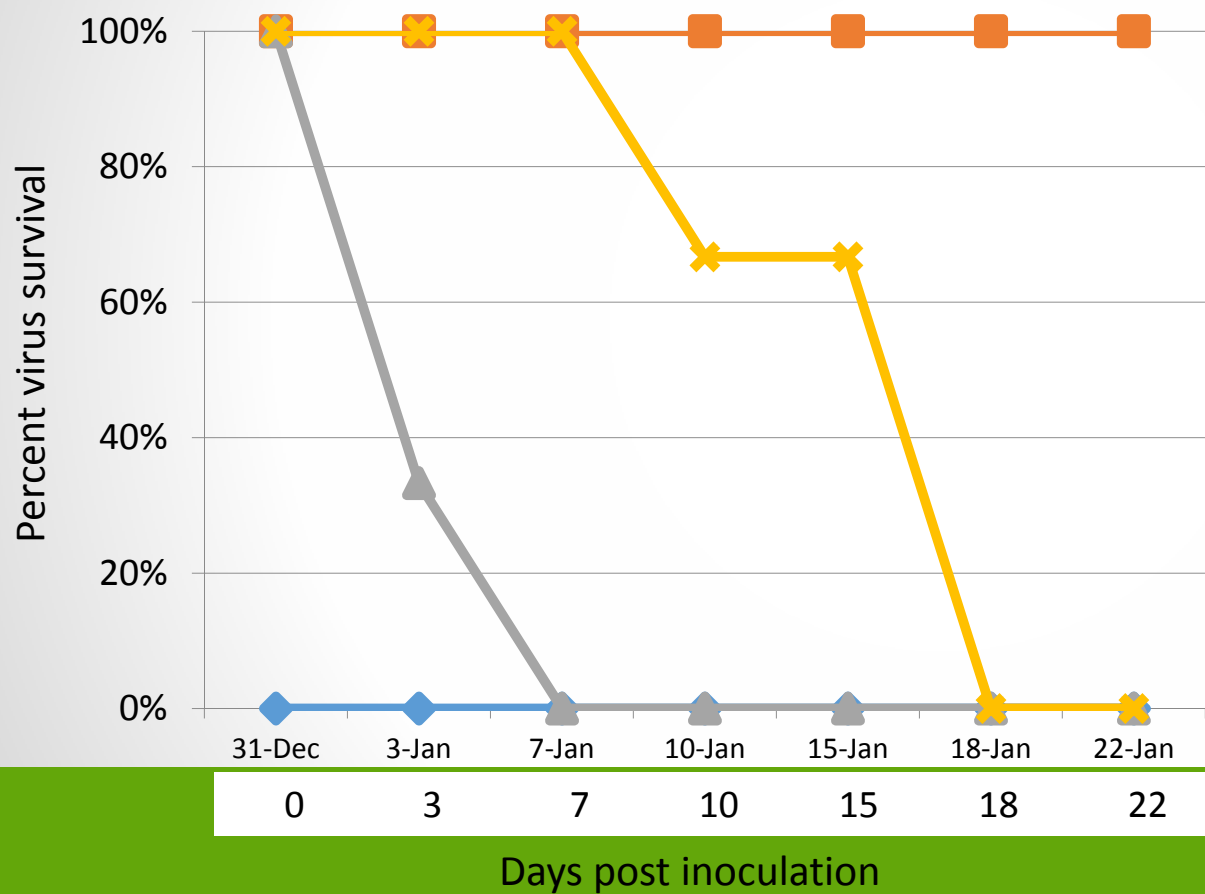


What kind of water?

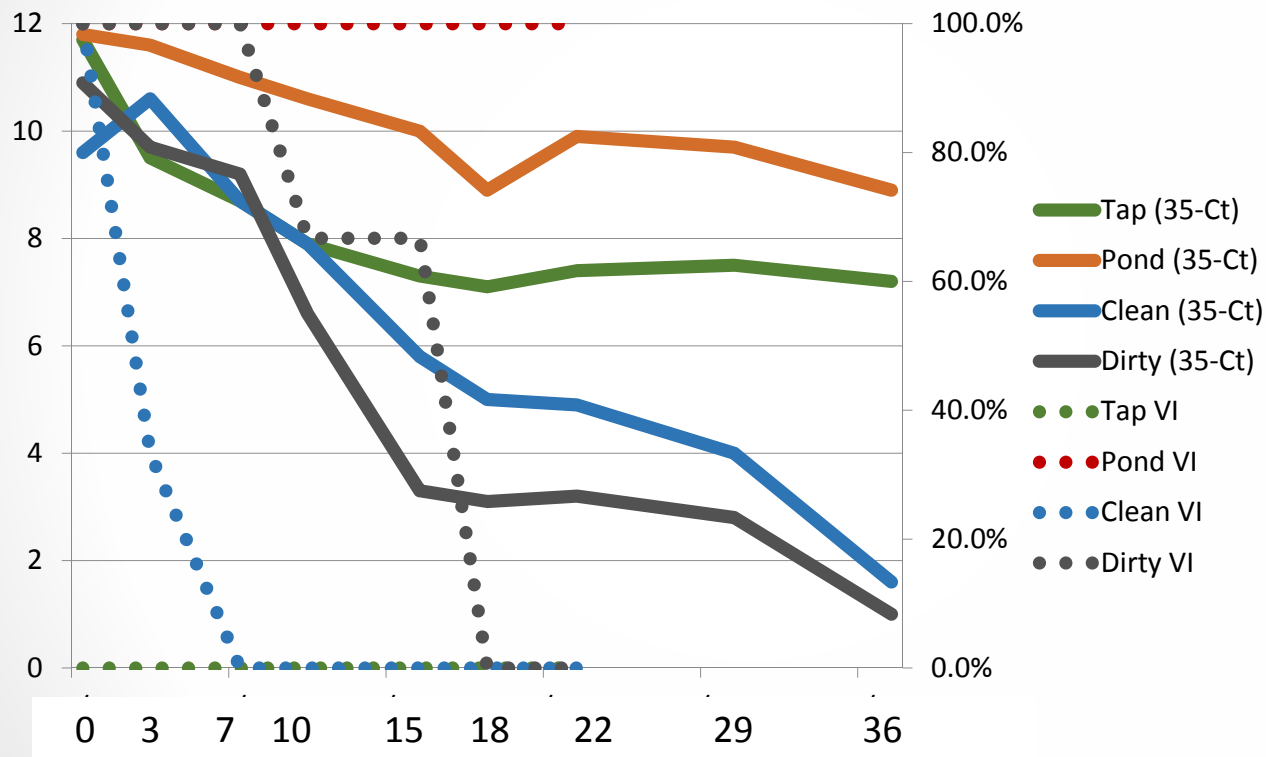
- Virus persistence studies have been done in HEPES buffered dH₂O (Lebarbenchon 2011, 2012)
- “Artificial Pond Water” can be prepared as a consistent water that is closer to an environmental sample
- Tap water is what the birds drink, but each farm would have its own well. There is wide variation in the pH and ion content of well water.



Survival of H7N9 in H₂O



RNA vs. live virus



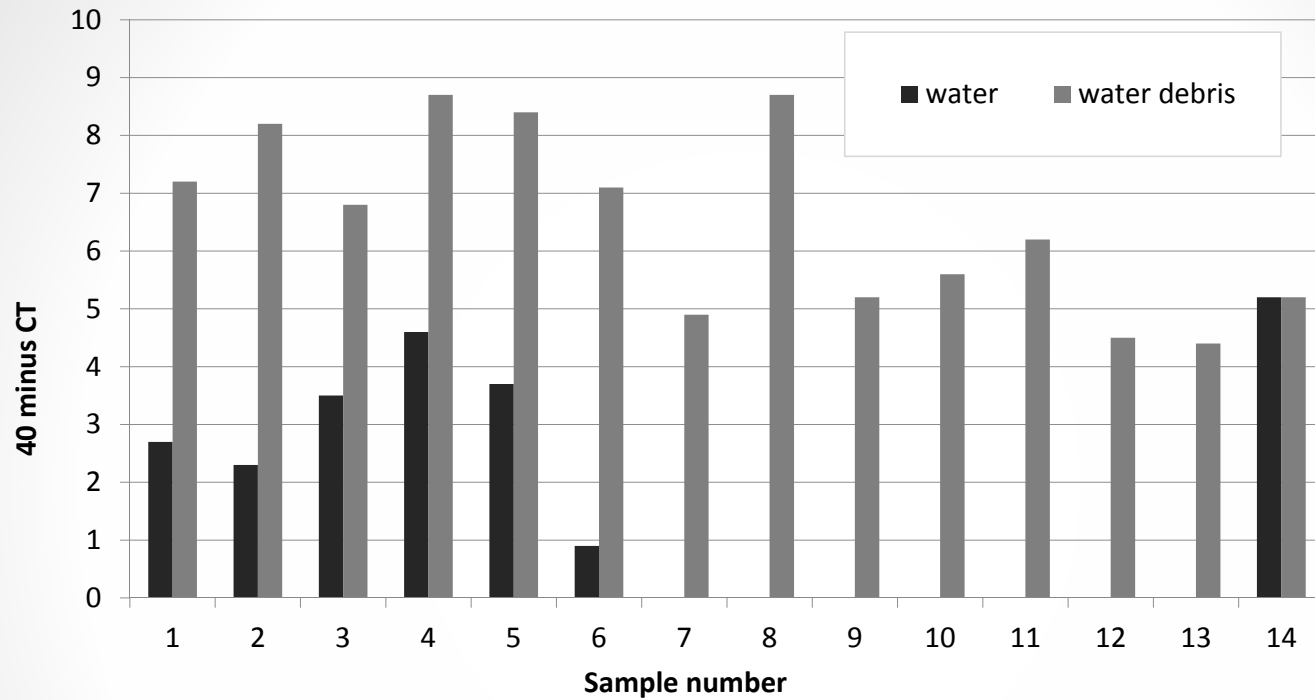


Figure 1. Detection of viral RNA by RTPCR in water samples and associated debris.

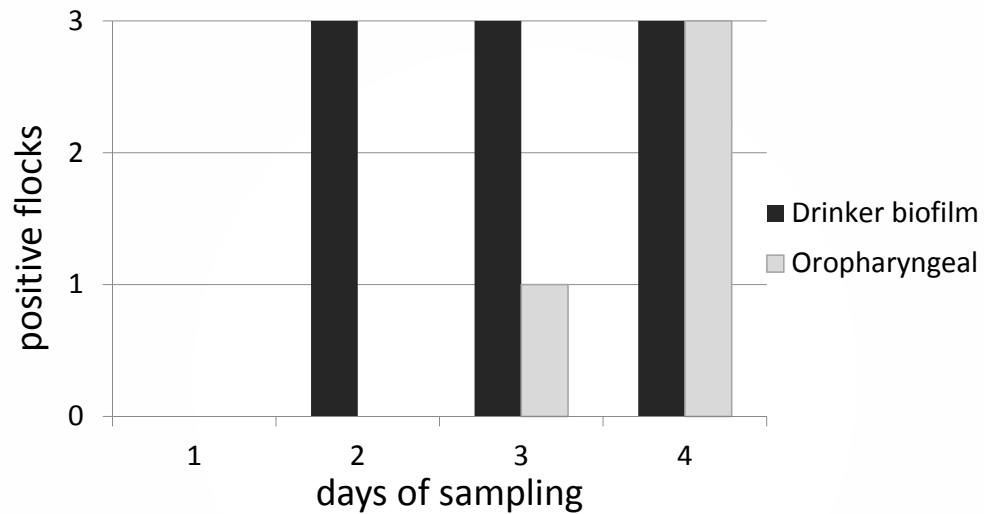
Drinker biofilm sampling

- Now a test at MCROC
- Part of active surveillance
 - 2 samples per barn taken 24-36 hrs pre-movement
- Used in HPAI outbreaks

Avian influenza Environmental Sample Collection Protocol

PROPER Drinker Sampling

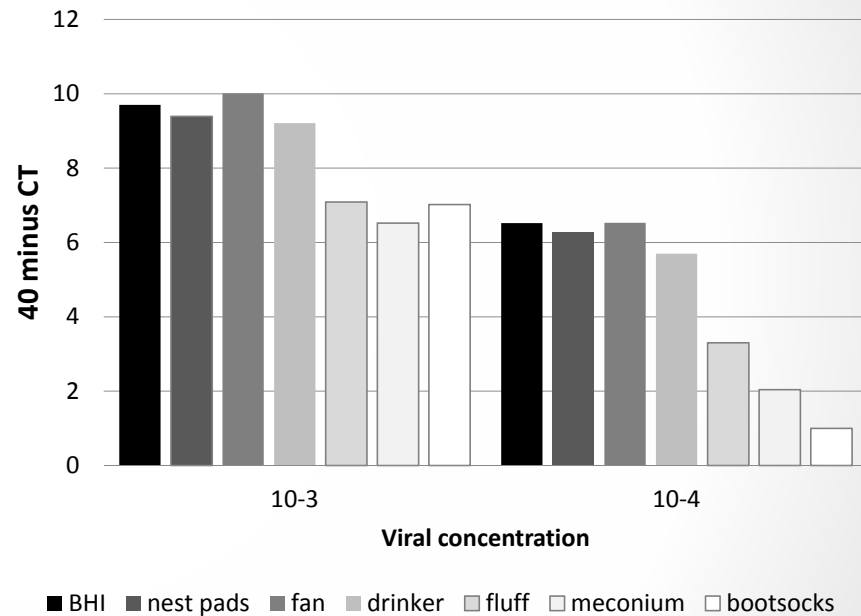




A comparison of drinker biofilm and oropharyngeal swab RTPCR results in HPAI infected flocks.

Influenza monitoring is not the only thing!

- Metapneumovirus
- Newcastle Disease
- Egg Drop Diagnostic



Metapneumovirus spiked samples

Some Caveats

- Regulatory environment
- This is an environmental test not a direct bird test
- Diagnostic lab certification
- Only applicable with open water systems



Questions?

