PHS
POULTRY
HEALTH
SERVICES

Animal &
Plant Health
Agency

# Two suspect vaccine-induced Avian encephalomyelitis cases in broiler chicks


- Katherine Gillett, Poultry Health Services
- Alistair Chilcott, Poultry Health Services
- Laura Bower Booth, APHA Lasswade

# Case 1
## Standard Broilers

Kath Gillett

# It starts on a Monday morning

**H1**

Parent flock X,

24 weeks

CDMR 3.2%

**H2**

Parent flock X +Y

CDMR 1.3%

H3

Parent flock Z

CDMR 1.6%

Post mortems-
Non specific findings incl non starters, small birds, dehydration and gizzard erosion

Started on Linco-spectin

Higher levels of infection- pericarditis, septicaemia and splenomegaly

Antibiotic treatment started

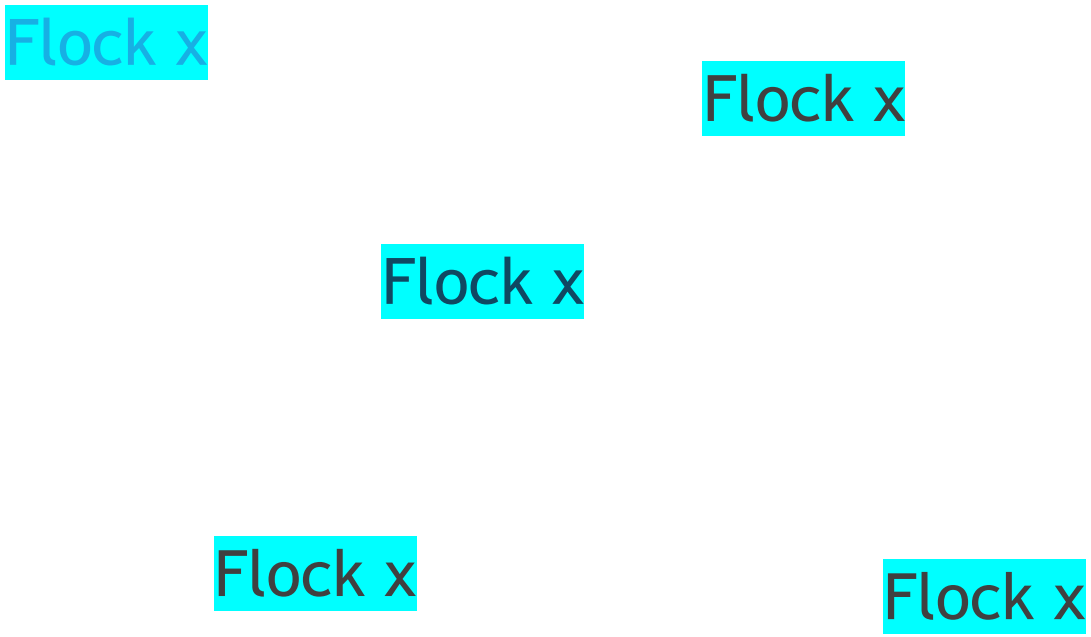
# Day 10

- Birds from house 1 were brought in again
- Culls jumped from 37 on day 9 to 72 on day 10.

Post mortem findings

Soft femoral necks were seen but no other significant pathology.

# The story unfolds…



# Day 12

Culls today are 1267 in house 1

# AE diagnosis

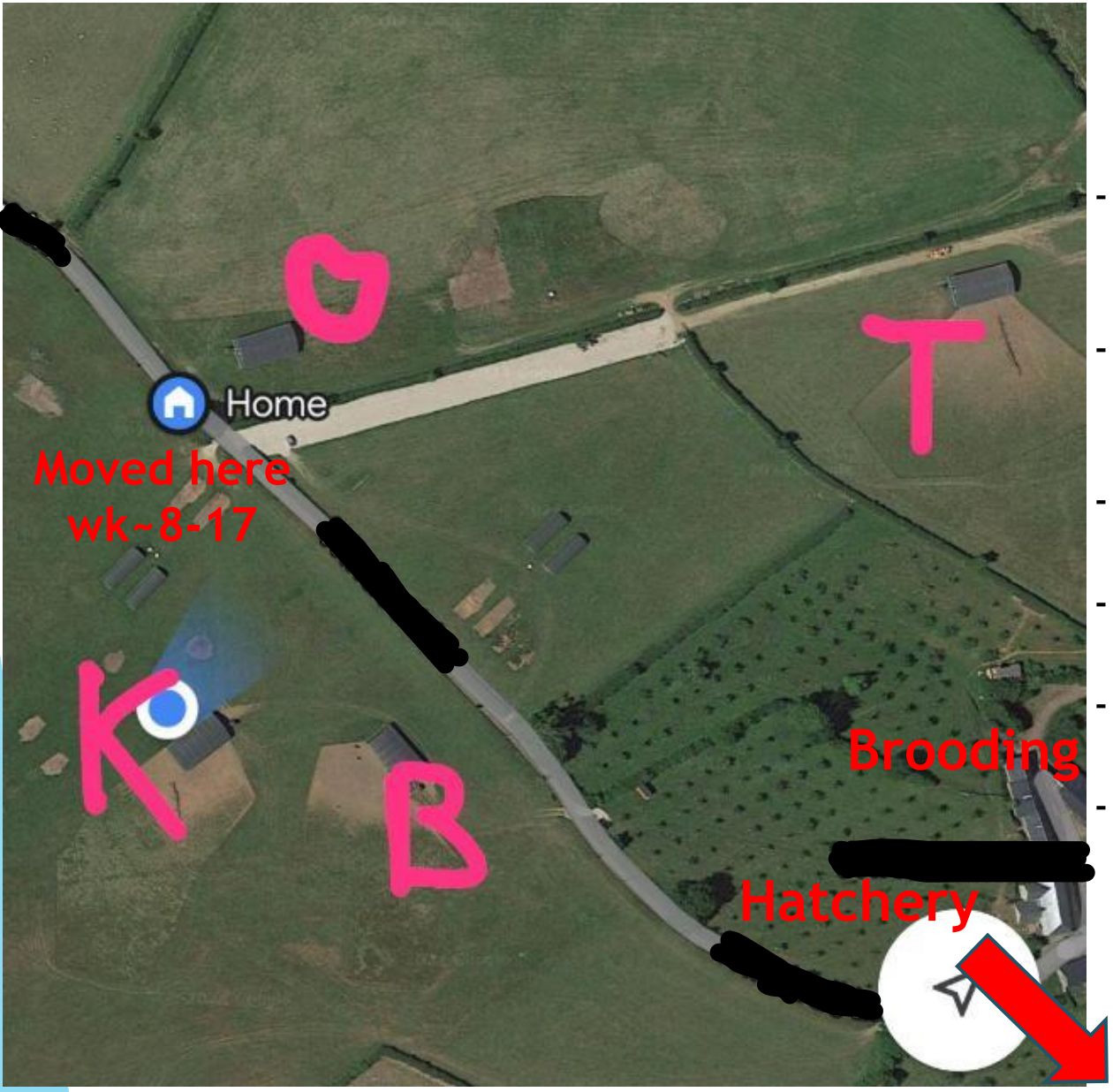
## Parent flock history

Along with

- -Little evidence of bacterial infection at PM
- -Failure to respond to antibiotics
- -Very high culling rate
- -Low mortality

# Case 2
## Organic Broilers

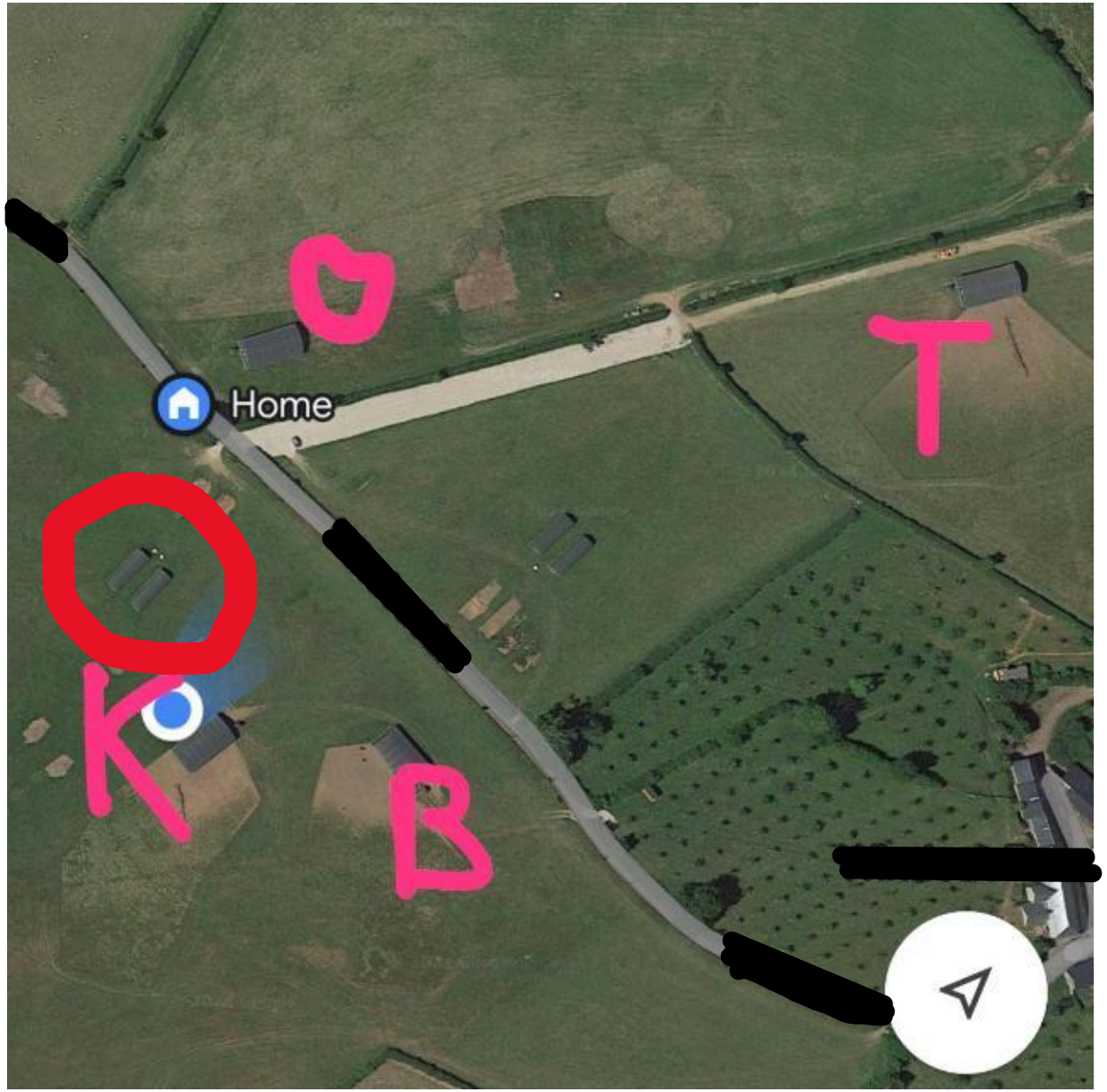
Alistair Chilcott




- 850F + ~150M Hubbard chicks in every 12 weeks
- Brooded in a re-purposed stable until ~8 weeks
- Moved out to rearing sheds in field
- Moved into adult shed at 18 weeks
- 4 ages of adult sheds
- Hatchery down the bottom of the farm

Move to the field

| AGE (days) | VACCINE | ADMIN |
|---|---|---|
| 3 - 5 | Salmonella TAD DUO | Water |
| 14 | IB 491 | SPRAY |
| 18 | Gallivac IBD or Bursine 2 | WATER |
| 21 | ND Clone 30 | SPRAY |
| 28 | Gallivac IBD or Bursine 2 | WATER |
| 35 | Nobilis MA5 + Clone 30 | SPRAY |
| 42 | Salmonella TAD DUO | WATER |
| 63 | Neomovac | SPRAY |
| 70 | Poulvac AE (NOT AVIPRO) x 2k doses | WATER |
| 84 | Thymovac | WATER |
| 91 | IB MA5 + 491 | SPRAY |
| 105 | Salmonella TAD DUO | WATER |
| 112 | MgBac or MYC-Vac | INJECTION |
| 112 | Nobilis RT+IBmulti+G+ND | INJECTION |


Home

# First set of serology results- Kitty shed~14-15 weeks

**AE by ELISA***

| House | Tested | Mean | CV | 0 | 1 | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Not stated | 10 | 313.8 | 168.3 | 9 | 1 | | | | | | | | | | | | | | | | | |

# Second set of serology results- Thea shed ~14-15 weeks

**AE by ELISA***

| House | Tested | Mean | CV | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| THEA | 10 | 11263.1 | 27.9 | | | | | | | | 1 | 4 | 1 | 2 | 2 | | | | | | | |

... we wait...

**Kitty had a vague production drop! ~10-15%**

## Broiler farm 1

11 days old, very high culling. NAD on PM. No bacteria grown.

**Carcasses** off for histo…

# APHA Investigations

Laura Bower Booth

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# Post-mortem Examinations

| Outbreaks 1 & 2 | Outbreak 3 |
|---|---|
| Standard broilers | Organic broilers |
| Separate farms, shared parent flock | Unrelated flock to Outbreaks 1 & 2 |
| APHA Shrewsbury | APHA Lasswade |

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# Post-mortem Examinations

**Outbreak 1**

- 12-days-old
- No significant gross pathology
- Bacteriology unrewarding

**Outbreak 2**

- 6-days-old
- No significant gross pathology
- Mixed flora including sparse *Enterococcus* spp. and *Escherichia coli* in 3/5 carcasses

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# Post-mortem Examinations

**Outbreak 3**

- 12-days-old
- Unevenness, poor feed intake, dehydration
- Mixed flora including sparse *Enterococcus cecorum* in 1/10 carcasses

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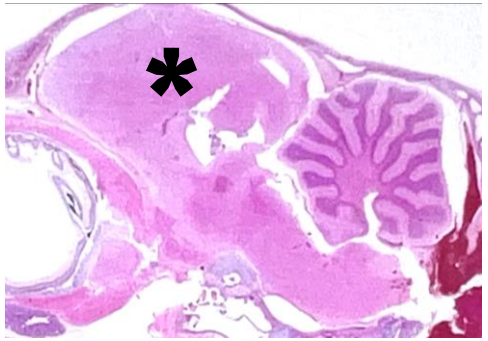
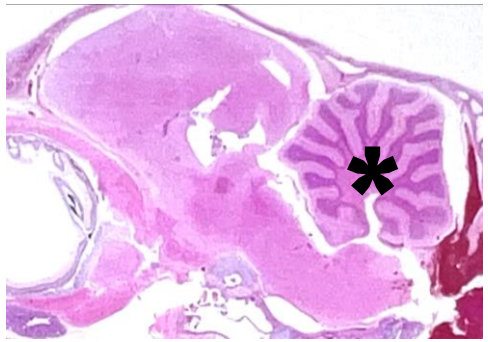
# Histopathological Findings



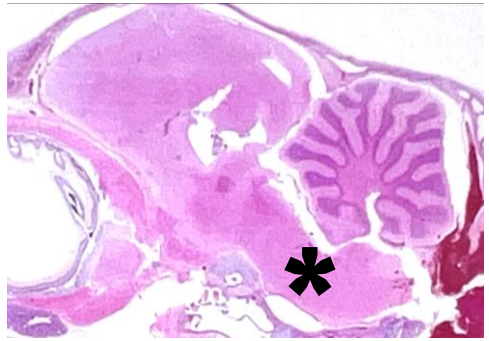
## Cerebrum

- Neuronal necrosis
- Perivascular cuffing



## Cerebellum

- Purkinje cell necrosis
- Gliosis



## Brainstem

- Chromatolysis
- Perivascular cuffing

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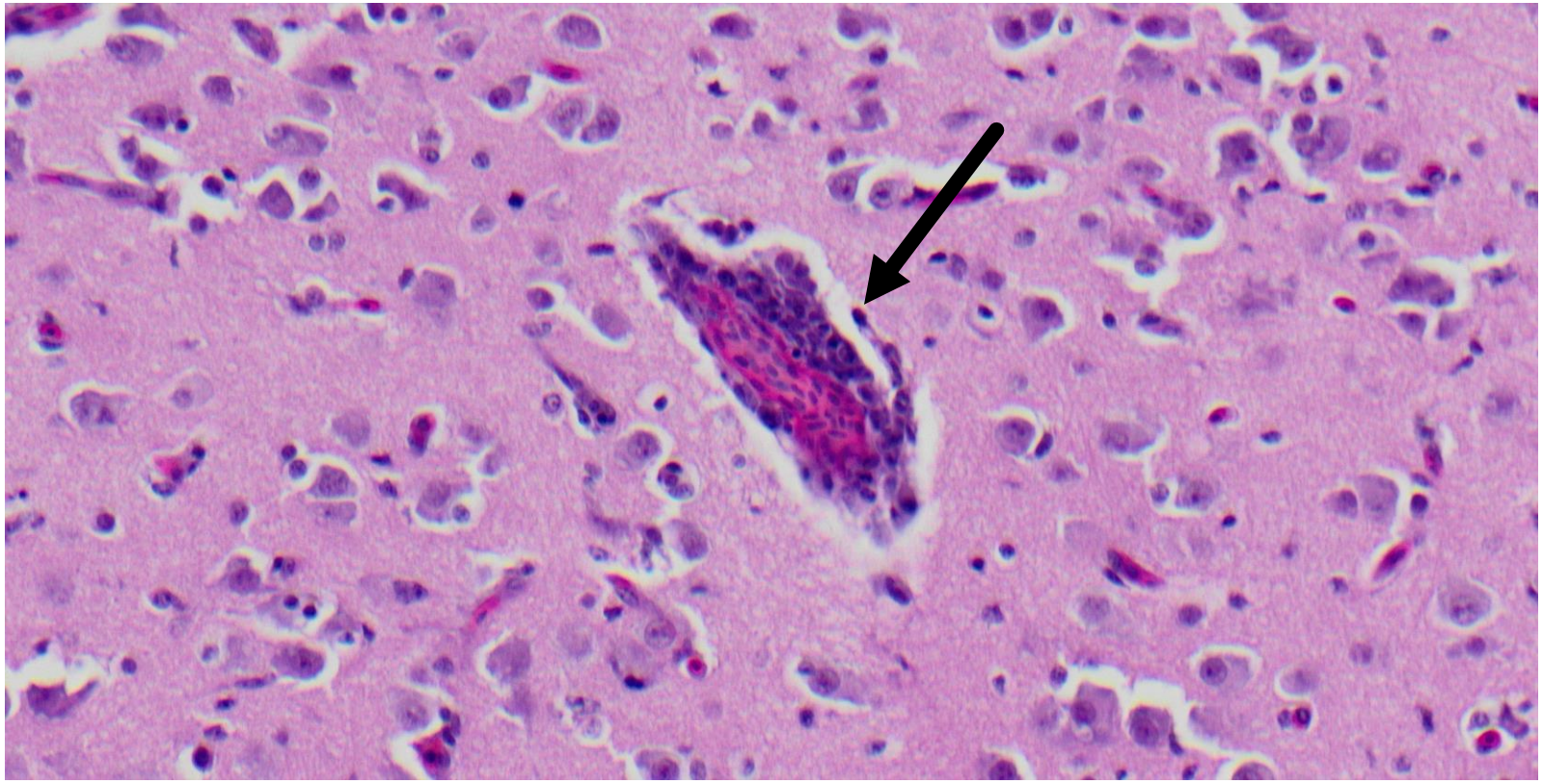
# Histopathological Findings



*Perivascular cuffing in the cerebrum, Outbreak 1, 12-day-old broiler*

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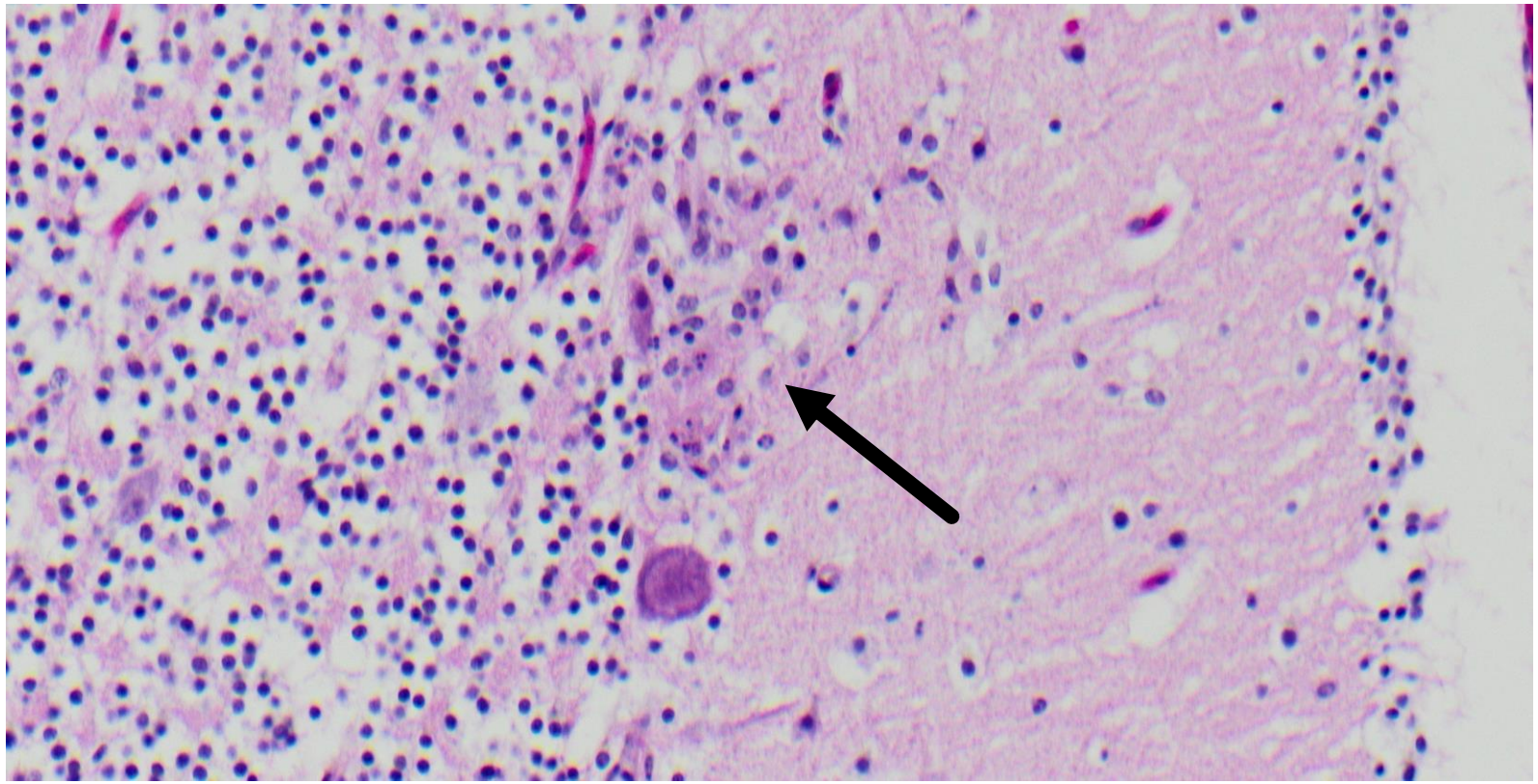
# Histopathological Findings



*Gliosis in the cerebellum, Outbreak 3, 12-day-old broiler*

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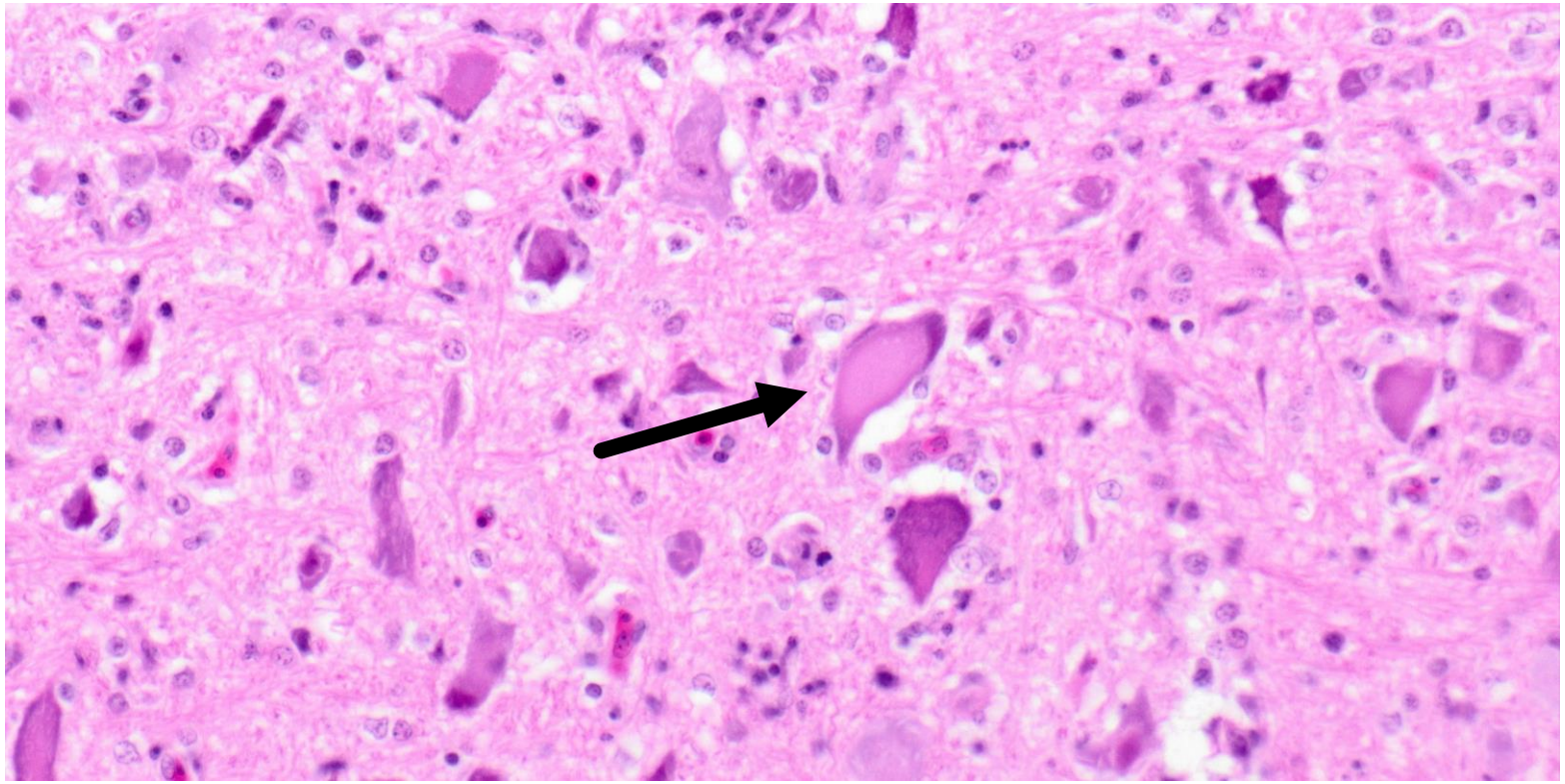
# Histopathological Findings



*Chromatolysis in the brainstem, Outbreak 1, 12-day-old broiler*

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# Summary of Findings

| | Outbreak 1 | Outbreak 2 | Outbreak 3 |
|---|---|---|---|
| **Histopathology** | Encephalitis 3/3 | Encephalitis 1/3 | Encephalitis 3/3 |
| **PCR** | Positive for AEV<br>CT 23.19 to 23.83 | Positive for AEV<br>CT 21.71 to 25.10 | Not tested |
| **Next Generation Sequencing** | AEV detected 3/3 | AEV detected 3/3 | AEV detected 5/5 |

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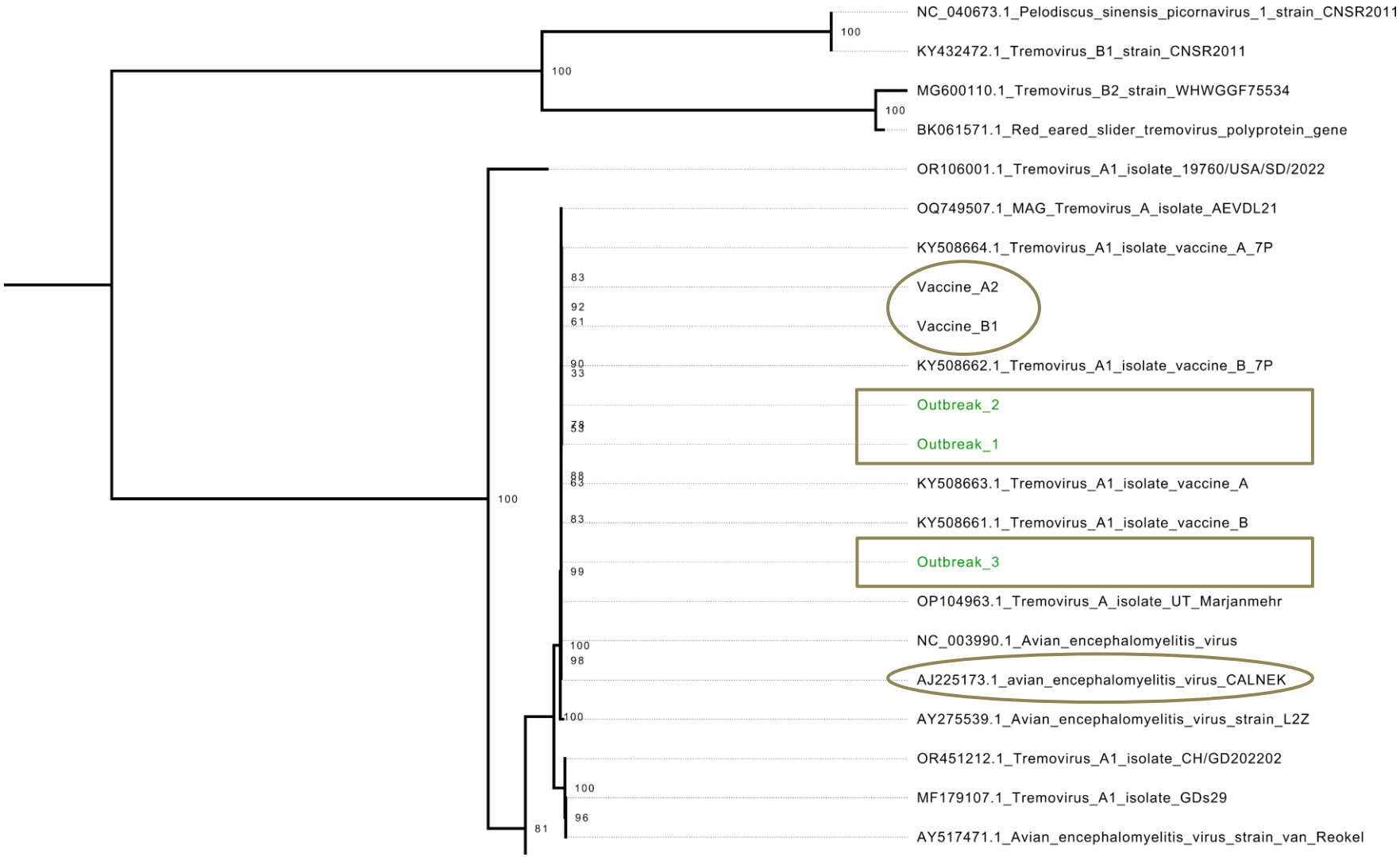
# Next Generation Sequencing



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# Diagnostic Conclusions

- Histopathology detected encephalitis in all three outbreaks
- Next generation sequencing confirmed the presence of AEV in brain samples from clinically affected broilers
- Isolated strain exhibited strong genetic similarity to the Calnek reference strain used in commercial AEV vaccines
- No other wild-type AEV strains were identified
- Given clinical history, vaccine exposure most likely source of infection

1 week later…

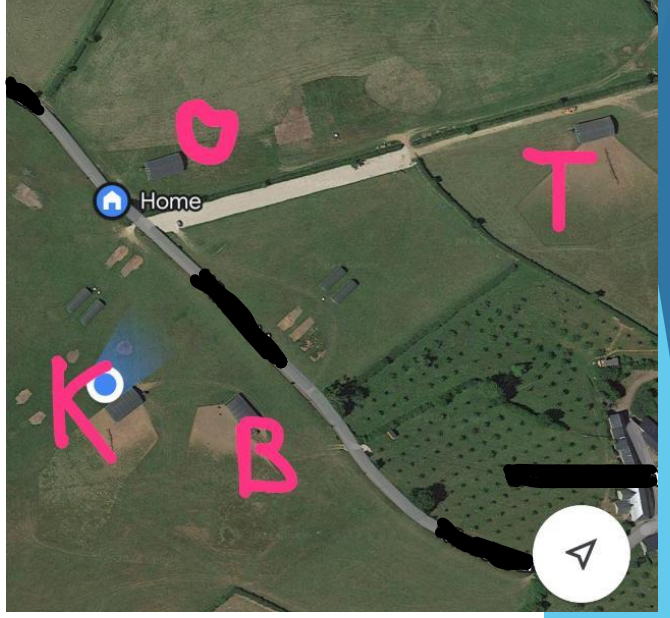
2nd farm affected

…

3 weeks worth of placings, multiple farms.

Also, some farms unaffected from the same hatch…

# Repeat serology on the parents




## Kitty ~34 and ~38 weeks

**AE by ELISA***

| House | Tested | Mean | CV | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kitty | 10 | 4020.9 | 137.1 | 6 | | | | 1 | | 1 | | 1 | | | | 1 | | | | | | |

**AE by ELISA***

| House | Tested | Mean | CV | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Kitty | 10 | 4718.8 | 157.8 | 5 | 1 | 1 | | | | | 1 | | 1 | | | | | | 1 | | | |

**AE by ELISA***

| House | Tested | Mean | CV | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Barney 64 | 10 | 21522.3 | 24.7 | | | | | | | | | 1 | | | | | 3 | | 3 | 3 | | |
| Otto 49 wk | 10 | 18213.1 | 44.0 | | | 1 | | | | | | 1 | | | | 2 | 2 | 1 | | 2 | 1 | |

| January | | | | | | |
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| February | | | | | | |
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| March | | | | | | |
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| April | | | | | | |
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| May | | | | | | |
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| June | | | | | | |
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| July | | | | | | |
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| August | | | | | | |
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| September | | | | | | |
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| October | | | | | | |
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| November | | | | | | |
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| December | | | | | | |
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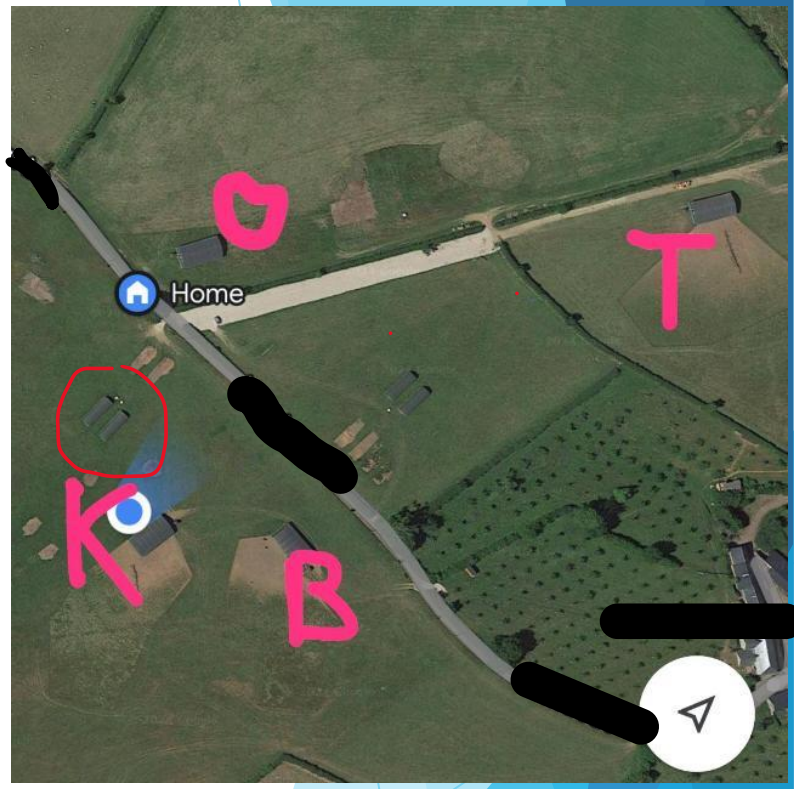
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

# Sick, hatched, set, collected...

LE MOVEMENTS

New Chicks 9/4/24

| To be filled in when born | To be filled in when eartag is lost | To be filled in when animal is moved onto or o | |
|---|---|---|---|
| Dam's indentification number | Replacement eartag number (for animals born before 15th April 1998) | Age or date of birth (when known) | Holding from which moved and name and address of person from whom delivery taken |
| 6/25 | 9/4/24 | IBM A5 | SA18 1AA 45 |
| 6/25 | | Grout | A364A |
| 6/25 | 13/4 | Salmonella Dub | F0677D |
| 8/24 | | | |
| 7/24 | 23/4 | IB491 | SA18 5AA35 |
| 6/25 | 25/4 | Gallivac | IBD 5796 |
| 8/24 | 2/5 | NDClone30 | SA19AA18 |
| 7/24 | 9/5 | Gallivac | F16064 |
| 8/24 | 15/5 | IBM A5 | SA18 1AA 45 |
| 6/25 | | NDClone 30 | SA19AA18 |
| 7/24 | 23/5 | Salmonella | F0677D |
| 12/24 | 14/6 | Nemovac | F16625 |
| 7/25 | 23/6 | AE | 68/884 |
| 9/25 | 7/7 | Thymovac | F0655F |
| 10/25 | 15/7 | IBM A5 | SA27 8AA37 |
| 5/25 | | IB491 | SA18 5AA35 |
| 4/25 | 18/7 | Salmonella | F0811A |
| 10/25 | | | |
| 12/24 | 23/7 | IFR Nobilis | 1531A16 |
| 7/25 | | Rt IB+GT ND | |
| | | MG | 702025 |



# Contra-indications, warnings, etc

Do not vaccinate sick, debilitated or stressed birds.

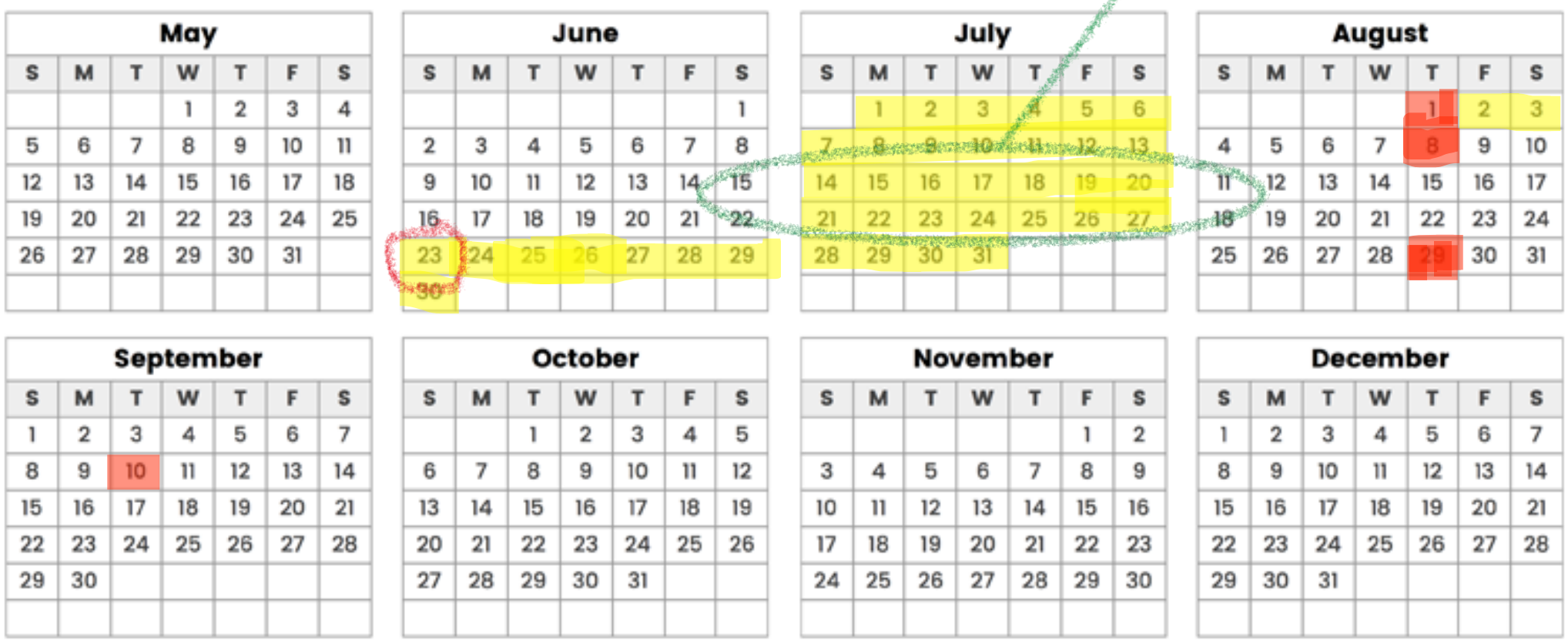
Do not vaccinate birds of less than 10 weeks of age.

In order to prevent spread of vaccine from vaccinated flocks to non-vaccinated flocks, all non-vaccinated birds present on the farm must be vaccinated at the same time.

Vaccinated animals should not be in contact with non vaccinated animals for 42 days post-vaccination.

Kitty production drop!

# Vaccinated, risk-period of spread…



**May**

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**June**

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| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | | | | | | |

**July**

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| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
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**August**

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**September**

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**October**

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| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 | | |

**November**

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| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |

**December**

| S | M | T | W | T | F | S |
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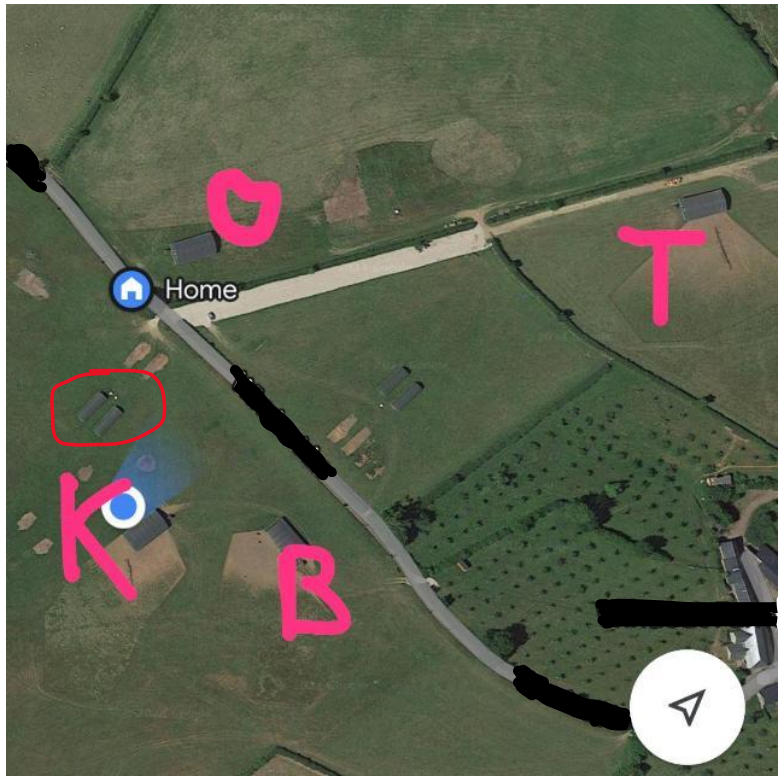
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

# Sick, hatched, set, collected…

# Actions taken

- Changed layout of the farm
- Monitor every flock
- Vaccine administration audit- now using oral gavage technique



# Contra-indications, warnings, etc

In order to prevent spread of vaccine from vaccinated flocks to non-vaccinated flocks, all non-vaccinated birds present on the farm must be vaccinated at the same time.

Vaccinated animals should not be in contact with non vaccinated animals for 42 days post-vaccination.

Do not use in birds in lay and within 4 weeks before the start of the laying period.

# Vaccines are not benign if used inappropriately

Animal & Plant Health Agency

# Acknowledgements


- Alex Schock, Christopher Poulos, Catarina Guerreiro and Richard Quinn – APHA Lasswade
- Mirjam Schilling, Tiernan Briggs, Dan Maskell – Genomics for Animal and Plant Disease Consortium – APHA Weybridge
- Royal GD Animal Health
- Suzi Bell – APHA Shrewsbury
- Zoe Treharne – Veterinary Lead, Avian Expert Group, Surveillance Intelligence Unit, APHA
- William Ingham Farrow – PHS Shrewsbury
- Ellie Radford – PHS at Mount Vets