

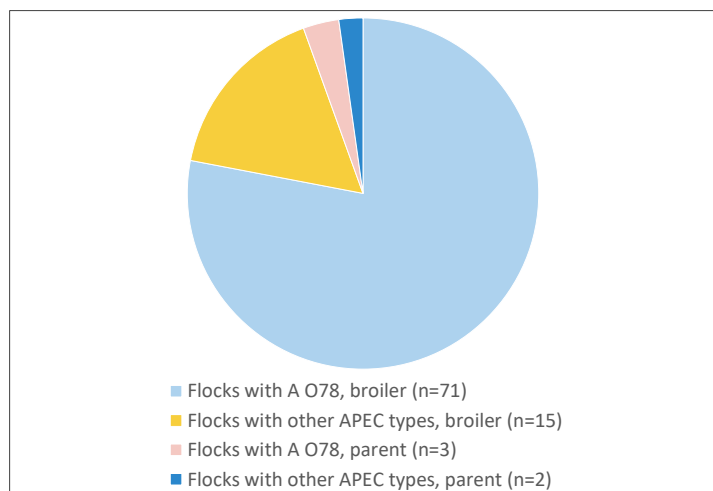
# Typing of APEC isolates revealed an outbreak of broiler colibacillosis caused by ST23 O78:H4 in Finland

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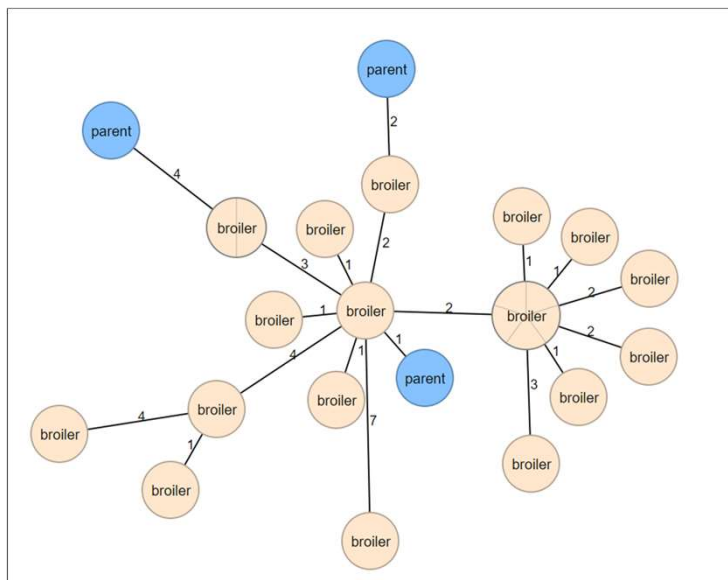
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## Introduction

Colibacillosis, a major bacterial disease in poultry, is caused by avian pathogenic *Escherichia coli* (APEC). In Finland, a colibacillosis outbreak occurred in 2021, impacting numerous flocks across the three major broiler companies in the country.



▲ Figure 1. Number of flocks with avian pathogenic *Escherichia coli* (APEC) type A O78 isolates and other types identified within the colibacillosis outbreak.



▲ Figure 2. cgMLST-based minimum spanning tree for 25 isolates ST23 O78:H4. Node colors represent production stage: blue=parent and beige = broiler. The number next to connection line represents the number of allele differences between neighboring isolates. Connection line distances are not in scale.

## Materials and Methods

- Sample Collection: 91 flocks, median of six birds per flock, average age 22 days. Both parent and broiler flocks included.
- Bacteriological Cultivation: Inner organs and bone marrow samples. *E. coli* isolates collected.
- PCR Typing: Phylogeny group and eight virulence-associated genes.

## Results

- Clinical Findings: Polyserositis, cellulitis, femoral head necrosis.
- *E. coli* Typing: Surge in APEC type with phylogeny group A and virulence genes *cva*, *irp2*, *iss*, *lucD*, and *tsh*. 76 % of typed isolates belonged to this type and it was found in 79% of investigated flocks (74/91). Same type was present in all three companies.
- Whole Genome Sequencing (WGS): 25 isolates; ST23, serotype O78:H4, high genetic similarity based on core genome MLST (cgMLST) (allele differences 0-13, mean 5).

## Discussion and conclusions

- Epidemiological Connection: Common grandparents, vertical transmission of APEC strains in broiler pyramid.
- PCR Typing: Cost-effective and reliable for detecting outbreak strains in colibacillosis.
- Disease Prevention: Typing isolates can aid in creating autogenous vaccines.

## References:

1. Clermont, O. et al: Rapid and Simple Determination of the *Escherichia coli* Phylogenetic Group. *Appl. Environ. Microbiol.* 66 (2000)
2. Ewers, C. et al: Rapid Detection of Virulence-Associated Genes in Avian Pathogenic *Escherichia coli* by Polymerase Chain Reaction. *Avian Dis.* 49 (2005)