



Outbreaks of highly pathogenic avian influenza in Denmark, 2020-2023

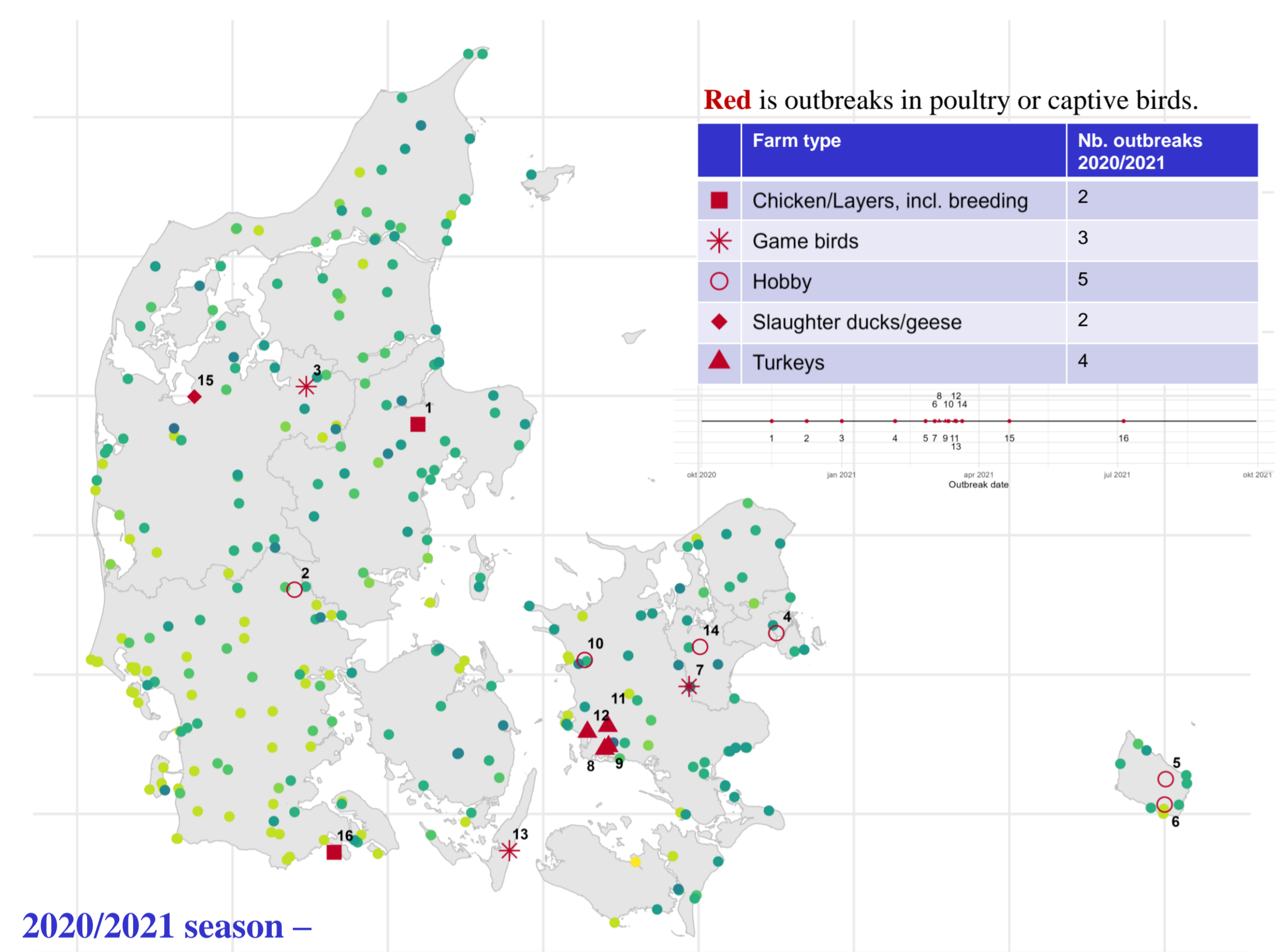
Boklund, A.^{1*}, Liang, Y.¹, Larsen, L.E.¹, Kirkeby, C¹, Kjær, L.J.¹, Jensen, H.A.¹ & Hjulsgager, C.K.²

Conclusion: During the three seasons from October 2020-September 2023, a total of 36 outbreaks of high pathogenicity avian influenza viruses (HPAIVs) were detected in Danish poultry or captive birds. In five outbreaks, secondary transmission could not be ruled out, while the majority could be defined as primary outbreaks, caused by direct or indirect contact with wild birds.

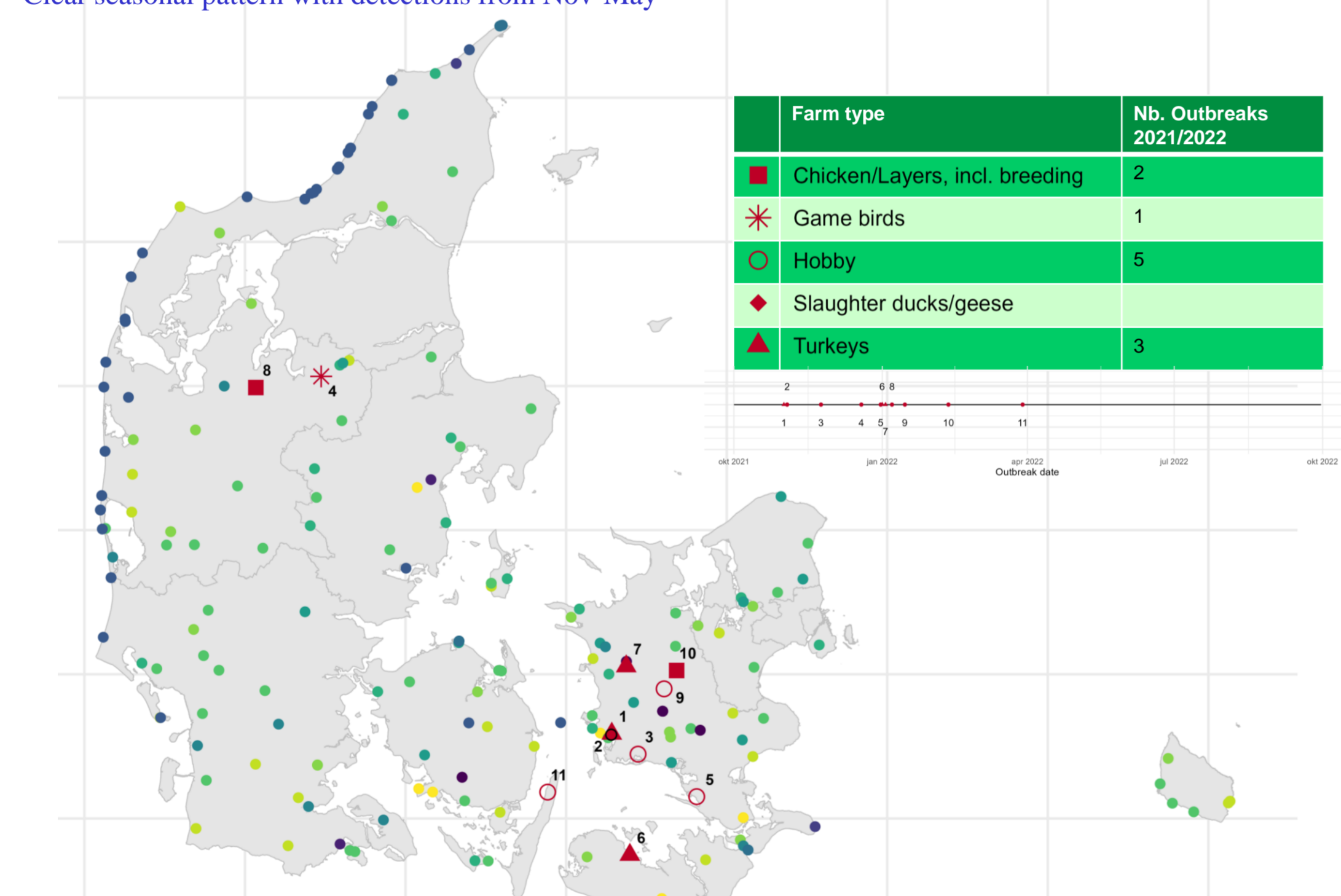
The seasons have differed and can be described as,

- **20/21** season with many outbreaks, most often caused by H5N8 and a silent summer period,
- **21/22** season with a dominance of seabirds affected during the summer, less seasonality, and most outbreaks caused by H5N1
- **22/23** season with fewer outbreaks, few detections in seabirds, but still detections all year round, still H5N1.

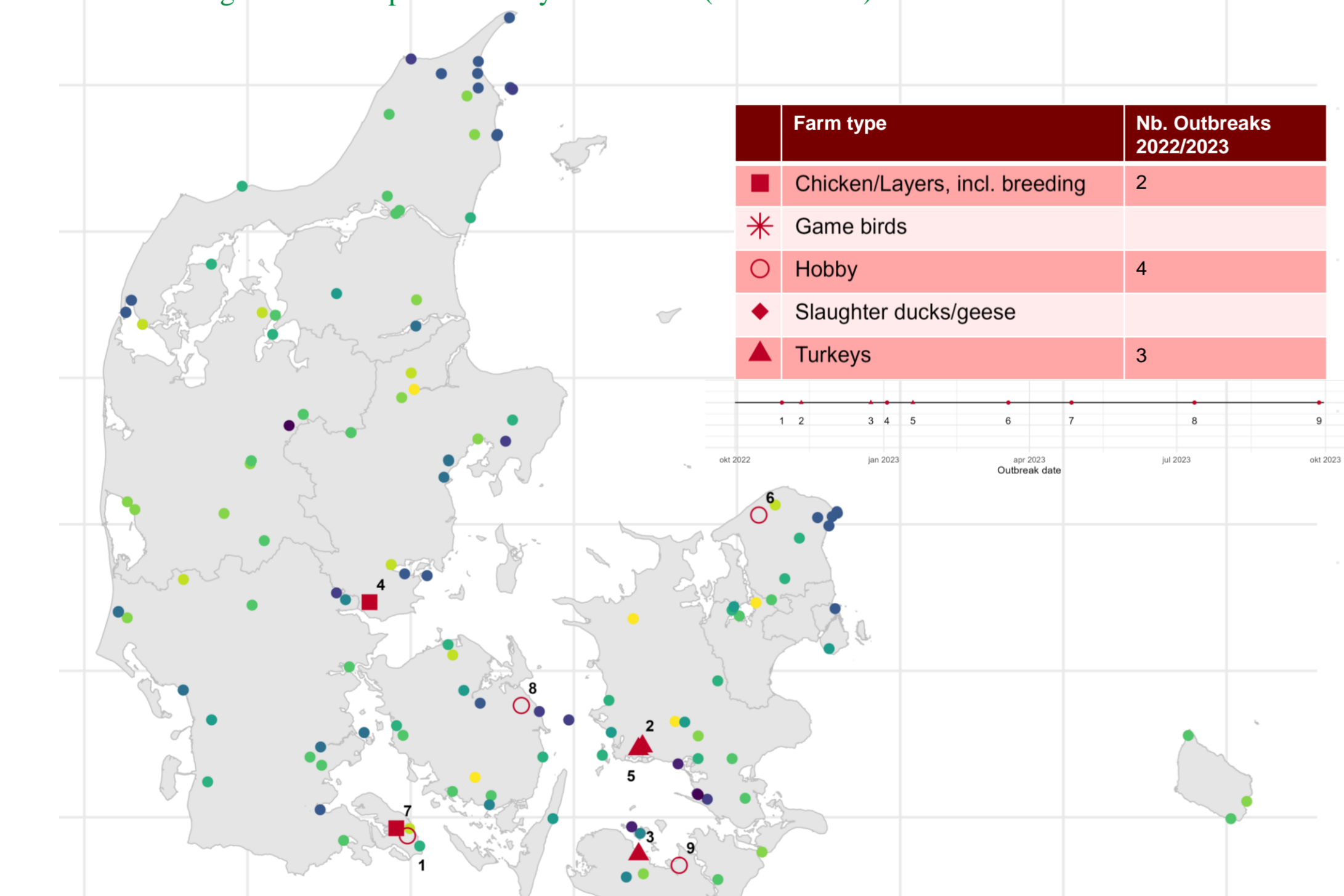
HPAI outbreaks in Denmark, in poultry, captive birds and wild birds (passive surveillance), in the seasons 20/21, 21/22, 22/23 (October-September)



2020/2021 season –
Widespread detections in wild birds and poultry/captive birds
Clear seasonal pattern with detections from Nov-May



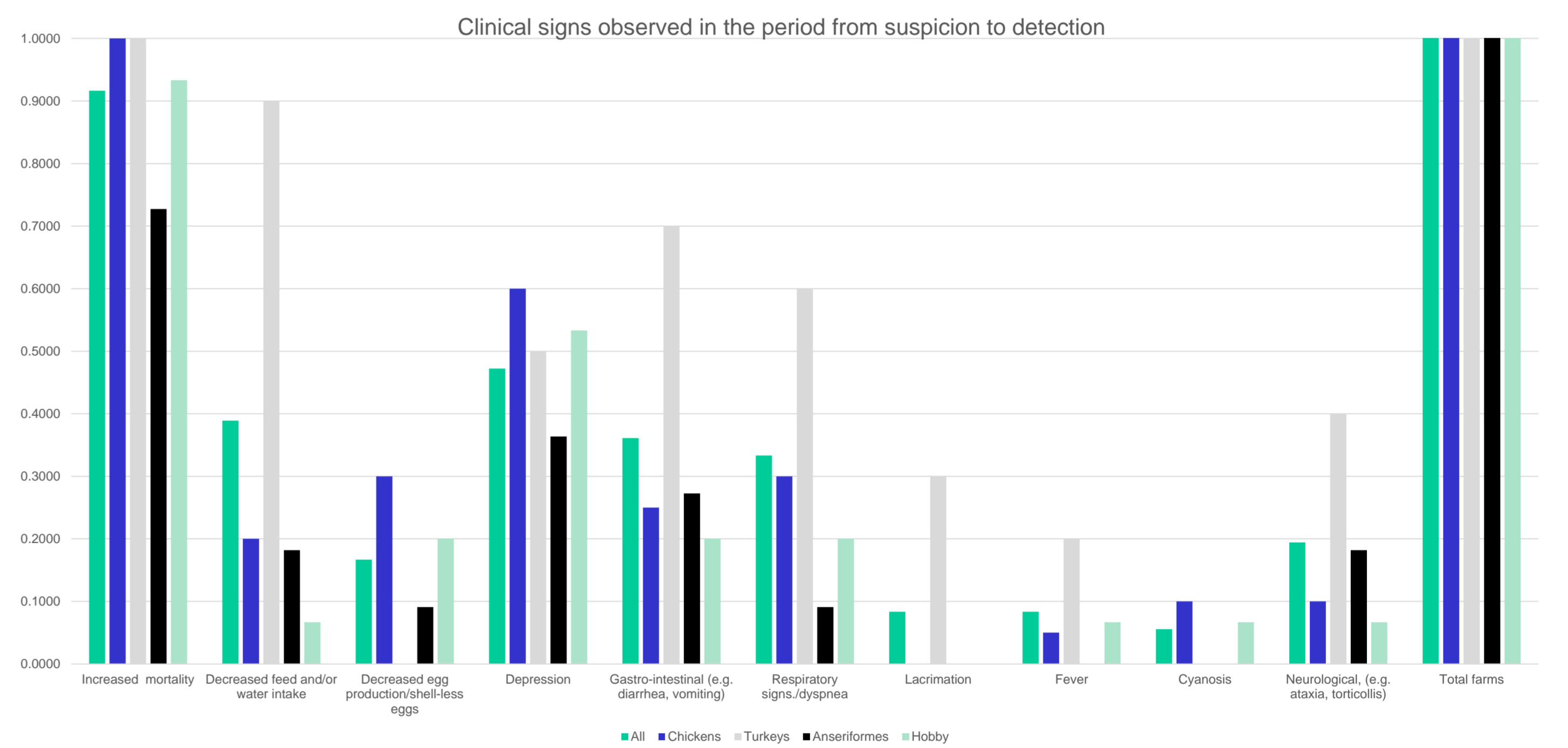
2021/2022 season –
Fewer detections in wild birds and poultry/captive birds all year in comparison to the previous season
Detections during the summer period mainly in sea birds (coastal areas)



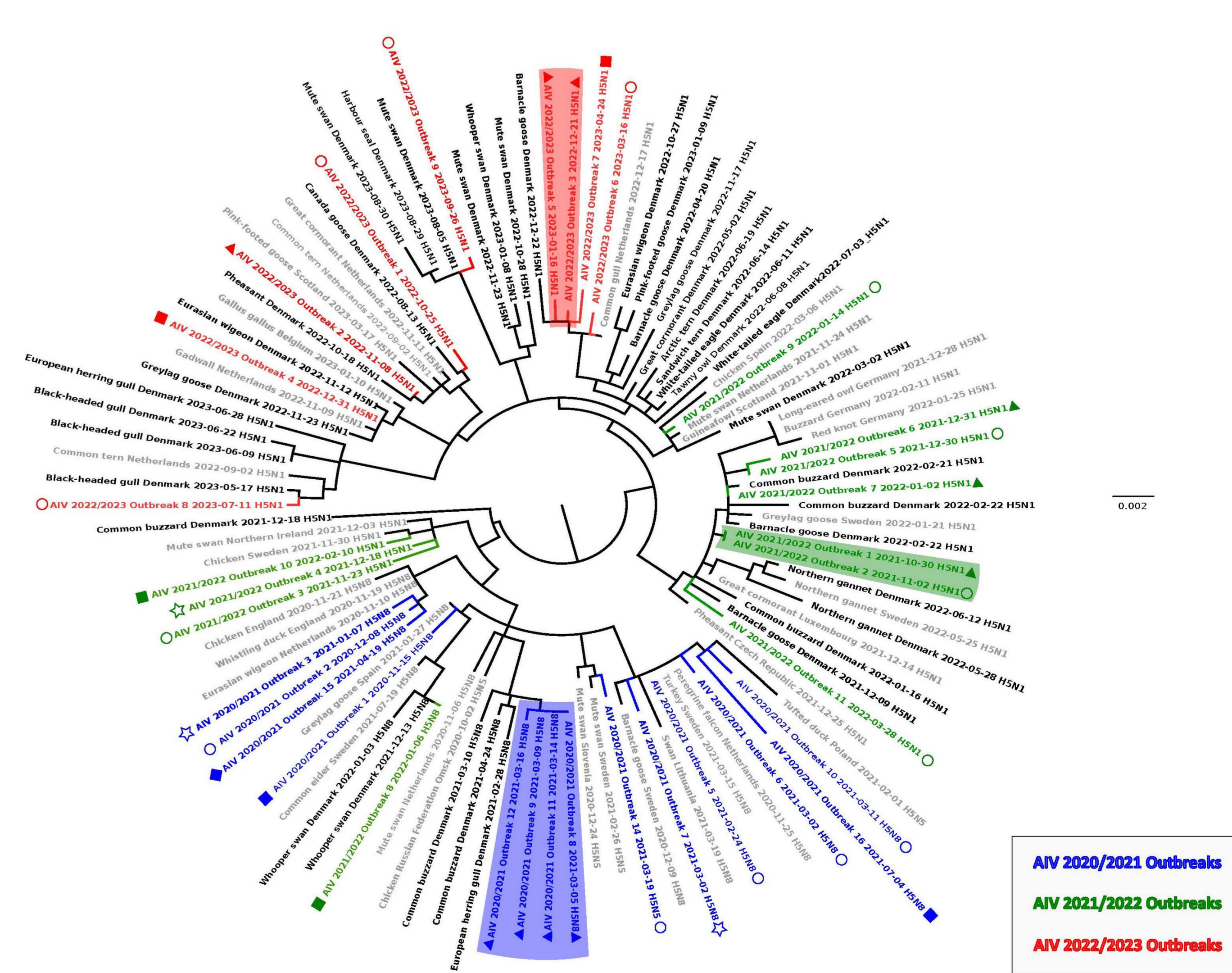
2022/2023 season –
Overall fewer detections in wild birds and poultry/captive birds in comparison to the previous seasons
Still detections all year

Number of farms (poultry and captive birds) reporting varying clinical signs observed until the date of detection

Clinical signs observed	2020/2021	2021/2022	2022/2023
Increased mortality	14	11	9
Respiratory symptoms	5	3	1
Diarrhea	3	3	7
Depression	4	6	8
Decreased production	1	1	4
Decreased feed/water intake	7	4	2
Cyanosis/torticollis/ataxia	3	3	3
Lacrimation/rhinorrhoea	1		3



Watch the detections over time in the QR link. Blue are wild bird detections, red are poultry/captive birds. Each detection is shown from detection date + 30 days.



Maximum-likelihood tree of HA gene sequences from clade 2.3.4.4b HPAIVs detected in wild and domestic birds in Denmark during 2020-2023. Representatives of European HPAIVs have also been included and were obtained from the GISAID Databank (<https://www.gisaid.org>). The tree was inferred with IQ-tree (version 2.0.3) with parameters “-bb 1000 -nm 2500” and the model HKY+G. Figures before/behind the outbreaks indicate farm type (see tables in left column of the poster). Outbreaks with background color were almost certainly infected with the same virus strain. This included four turkey farms in the 20/21 season, one turkey farm and one hobby farm in the 21/22 season, and two turkey farms in the 22/23 season.

Maps and videos were based on data from ai.fvst.dk on wild birds and data from the Danish Veterinary and Food Administration on outbreaks. Data on clinical signs originated from epidemiological investigations done by the Danish Veterinary and Food Administration.



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