

Insights into Avian Influenza epidemiology at the wild birds/poultry interface

Part 1: Wild fauna visits to poultry farms assessed by camera trapping

Objective: The part one of the study was to capture information on wildlife frequenting poultry farms.

Materials&Methods: Nine infrared and motion-sensing camera traps (Dark Ops Pro XD dual lens, Browning, Morgan, UT) were deployed on 3 different type of poultry farms (free-range, in-door, in-door with outside access), in an high risk zone of introduction and diffusion of Avian Influenza virus (AIV) in the Bologna province, Emilia-Romagna, from January 2021 to February 2022. Camera traps were programmed to take 30 seconds-long videos after movement detection, with a 30 seconds-long lag period to avoid continuous image capturing. According to the cameras' specifications, movement could be detected up to 25 m away.

Preliminary results: Footages showed an abundance of wild species frequenting the poultry farms studied (Fig. 1). Most wildlife visits occurred during the day, from 6 am to 6 pm. Birds detected included species (Fig. 2) targeted for passive surveillance of H5 high pathogenicity Avian influenza viruses in European Union (EFSA et al., 2021). The level of biosecurity on the farm appeared to impact the frequency of wildlife visits.

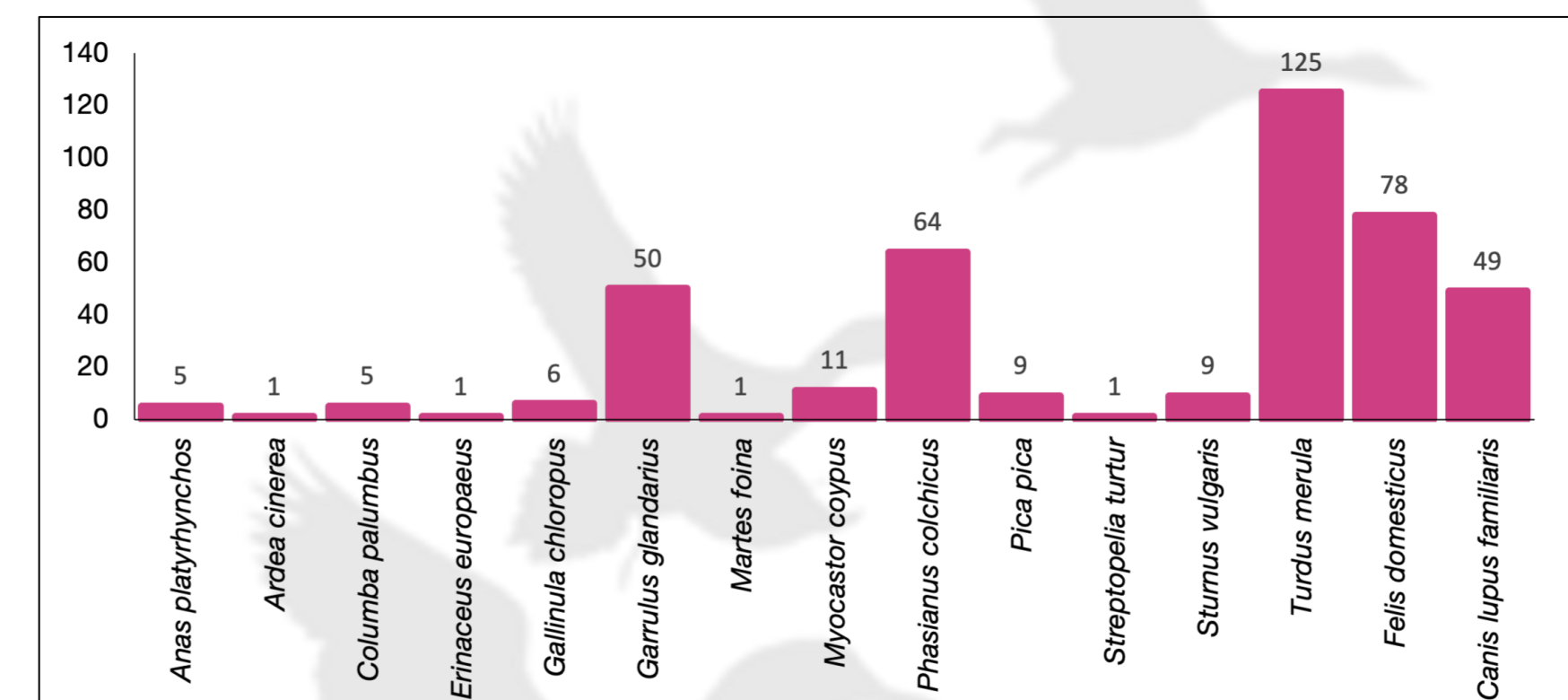


Figure 1. Counts of wild fauna and domestic animals recorded from one of the camera traps located aside of a poultry house.



Figure 2. Male and female wild mallards (*Anas platyrhynchos*) recorded during daylight in a poultry farm included in the study.

European Food Safety Authority (EFSA), Aznar, I., Baldinelli, F., Papanikolaou, A., Stoicescu, A., & Van der Stede, Y., &. (2021). Annual Report on surveillance for Avian Influenza in poultry and wild birds in Member States of the European Union in 2020. *EFSA journal*, 19.

Part 2: Expanding Avian Influenza surveillance in wild birds by investigating game ducks and monitoring migratory stopover sites

Objective: The aim of the part two of the study was to attempt the detection of AIVs in hunted wildfowls and environmental samples collected in wetlands.

Materials&Methods: qRT-PCR was used to detect AIVs in fecal deposits of wild birds collected from multiple migratory stopover sites across the Emilia-Romagna region, and in oropharyngeal and cloacal swabs of wildfowls hunted in the Bologna province during the 2021-2022 hunting season. Age class and sex of the sampled birds were determined through plumage features (Fig. 3).

Preliminary results: A total of 10 out of 521 samples (1.9%) tested positive to AIVs. Further molecular analysis are underway to characterize the detected strains.



Figure 3. An adult male Eurasian teal (*Anas crecca*) in breeding plumage. Wild ducks were hunted by licensed hunters according to the National Law 157/1992.

Future Plans: abroad period at the University of Georgia (USA), Poultry Diagnostic and Research Center

During the period abroad, a project will be conducted to understand the genetic determinants of interspecies transmission of AIVs through the use of bioinformatic, molecular and virological methods.