

Title:

A capture-recapture investigation of influenza A virus epidemiological dynamics in migratory Mallards *Anas platyrhynchos*, SE Sweden

Authors & affiliations:

Vladimir Grosbois², Neus Latorre-Margalef¹, Björn Olsen¹, Nicolas Gaidet², Jonas Waldenström¹

1 Section for Zoonotic Ecology and Epidemiology, Linneaus University, Kalmar, Sweden

2 UR AGIRs, CIRAD, TA C-22/E, Campus International de Baillarguet, Montpellier, France

Abstract: (Your abstract must use **Normal style** and must fit in this box. Your abstract should be no longer than 300 words. The box will 'expand' over 2 pages as you add text/diagrams into it.)

Investigations of epidemiological dynamics in ecological systems are often hampered by the difficulty of sampling and monitoring epidemiological states at the individual level. Since 2002, we have run a unique program that monitors the occurrence of influenza A viruses at the individual scale in migratory populations of Mallards *Anas platyrhynchos* at Ottenby Bird Observatory in Sweden. This protocol is run daily without any interruption since its initiation in Mars 2002. It combines the capture, marking and recapture of a large number of wild mallards (500 to 900 per year) and the search for avian influenza viruses at each capture of each monitored mallard through oropharyngeal/cloacal swab sampling and RRT-PCR based RNA detection. For more than 5000 mallards, this protocol has allowed us to establish the infectious state at each capture or recapture. The resulting individual infection histories are incomplete in the sense that an individual present on the study site at a given date is not necessarily captured or recaptured that day. We present the results of a multi-viral-states capture-mark-recapture analysis of these incomplete infection histories that allowed us to estimate fundamental epidemiological parameters while taking into account the imperfect capture/recapture process. We estimated daily probabilities of acquiring and clearing infection and depicted the temporal and inter-individual variation in these parameters. Moreover, we assessed the impact of infection on migratory behaviour and capture probability. Our study is the first description of individuals scale epidemiological parameters for avian influenza viruses in a population of wild birds.