

in Long-tailed Ducks (*Clangula hyemalis*) and Common Eiders (*Somateria mollissima*) in Churchill, Subarctic Canada

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INTRODUCTION

- Long-tailed duck and common eider have been exhibiting long-term population declines in N. A.; disease is a possible factor contributing to decline.
- Churchill represents southern breeding sites for long-tailed duck and common eider.
- These species migrate to Churchill from other regions of N. A., such as James Bay, where they come in contact with other migrants along flyways, potentially facilitating disease transmission.
- A shift in climate may allow some pathogens to expand the northern limit of their range.
- Disease ecology of long-tailed duck and common eider may be indicators of ecosystem change at lower breeding latitudes.
- Surveillance for 3 significant diseases of waterfowl (avian cholera, avian influenza [AI], and avian malaria) was conducted at Churchill with these 2 seaduck species.

OBJECTIVES

- Determine presence of *P. multocida* in these species and if present type bacterial DNA.
- Determine if AI is present and if present determine subtypes.
- Determine presence and prevalence of *Plasmodium*.



Bleeding long-tailed duck for avian malaria.

Study Site



- 4 subsites within 4,000 ha (58°44'N, 93°49'W).
- Located on Hudson Bay Lowlands, on coastal plain of sw shore of Hudson Bay.
- At confluence of 2 climatic and vegetative zones; boreal forest to south and Arctic Tundra to northwest.
- Last region of Hudson Bay ice breakup in summer.



Two mist nets set up over tundra lake.

METHODS

Study Population

- 19 long-tailed ducks (*Clangula hyemalis*), 2 common eiders (*Somateria mollissima*); Adults, M/F of each species.
- Captured during fast flying courtship and territorial flights over tundra lakes using mist nets over water.

Sample Collection and Processing

- Choanal and cloacal swabs were collected for avian cholera and AI testing (PCR), blood smears were evaluated for avian malaria microscopically.

Avian Cholera

- Caused by highly infectious bacterium *Pasteurella multocida*.
- Mass mortalities in areas of high waterfowl density; has occurred on all N. A. waterfowl flyways in Canada.
- N. A. epizootics first reported in Texas, more recently in E. Canadian Arctic.
- Although inconclusive, it is believed *P. multocida* reservoir exists in environment or in chronic carrier birds.



Pasteurella multocida on culture plate



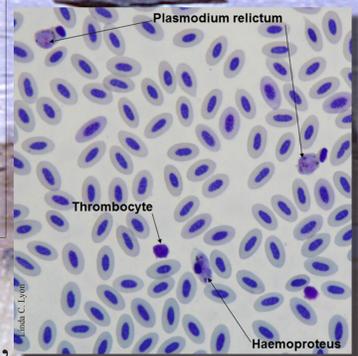
H5N1 virus

Avian Influenza

- Low pathogenic avian influenza (LPAI) virus subtypes (i.e., H5, H7, N1) can transfer from poultry to waterfowl and mutate to form zoonotic high pathogenic avian influenza (HPAI) H5N1.
- H5N1 can be pathogenic in waterfowl and humans.
- H5N1 outbreak in wild geese in China (2005) produced evidence to support hypothesis that wild birds are potentially involved in spread.
- International surveillance programs were enacted to track intercontinental movement of HPAI viruses.

Avian Malaria

- A disease of birds caused by blood parasites in genus *Plasmodium*.
- Vectored by mosquitoes (i.e., *Culex* genus).
- *Plasmodium* may be detected in peripheral blood.
- May cause severe anemia and weight loss, and possibly death.
- Some remote areas remain devoid of mosquito vectors or haven't been exposed to *Plasmodium*.



Plasmodium relictum
Thrombocyte
Haemoproteus

RESULTS

- A later than normal snow/ice melt; ducks arrived late, caught both M/F in courtship and territorial flights.
- All ducks tested negative for AI and avian malaria.
- Results for avian cholera testing are pending.

CONCLUSION

- Reasons for results include: small sample size, immunity, no exposure, low levels of pathogen, seasonal timing, inhospitable environment for pathogen.
- A changing climate could reduce or increase disease transmission and alter life-history traits for both pathogens and seaducks.
- Negative disease data reported in this study are a baseline for avian cholera, AI, and avian malaria and are data that have important value for long-term changes that might be occurring in Churchill area.

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