

## *In This Issue*

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### FLIGHT OF THE WATER BIRDS

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The ecology of Avian Influenza viruses (AIV) in waterfowl is not generally well-known in Africa. Migrating wild birds from Europe and Asia reach the African continent during the fall migration and come back in spring, potentially moving AIV strains between continents. **Caron et al.** report on a study of birds at two lakes in Zimbabwe where the authors sampled over a 2-year span. The authors provide the first indication of the persistence of low pathogenic AIV in waterfowl in a Zimbabwean wetland in over a year and discuss the implications in terms of persistence and maintenance of Influenza virus in southern Africa as well as the respective roles of wild birds and the environment.

Between March 2007 and May 2009, **Cumming et al.** counted, captured, and sampled water birds at five sites in South Africa, Botswana, Mozambique, and Zimbabwe. In all, 165 different species were sampled and overall prevalence of AI was 2.51%. They identified H5, H6, and H7 strains, but no H5N1. Viral occurrence was highly variable in space and time regardless of the annual influx of Palearctic migrants. The authors suggest that though water birds appear to have a role in carrying the virus, passerine birds may also be a link between wild birds and poultry.

### DISPERSAL BY TRADE

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The trade in live animals can result in conditions that promote pathogen dispersal and transmission. A recent and costly example is avian influenza viruses and the effect that live poultry trade has played in their spread. **Edmunds et al.** investigate the role that Vietnam's live trade in ornamental birds, which are often sold alongside poultry, may play in transmitting pathogens such as highly

pathogenic avian influenza H5N1 virus. Through examining trade drivers, trade volume, species involved, and spatial scale of the trade, the authors make recommendations for a more effective control of this potential route for disease transmission.

### OUR AMPHIBIOUS FRIENDS

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Emerging diseases and environmental contamination are leading hypotheses for global amphibian declines. Few studies have examined the influence of contaminants and predators on disease susceptibility. A study by **Kerby et al.** investigates the interaction of the insecticide carbaryl, dragonfly predator cues, and the emerging pathogen *Ambystoma tigrinum* virus (ATV) on fitness correlates and disease susceptibility in tiger salamander larvae. The results show that there are impacts on survival of larvae from virus and predator cue treatments, as well as an interactive effect between the two where predator cue strongly exacerbates disease driven mortality. These findings highlight the importance of examining natural stressors in conjunction with introduced stressors to understand potential impacts on amphibian species.

Amphibian chytridiomycosis is an infectious disease caused by the fungus *Batrachochytrium dendrobatidis* (Bd) that is implicated in worldwide amphibian declines in more than 200 species, as well as extinctions. Africa is a proposed potential source for the global expansion of Bd. However, the distribution of Bd across the continent remains largely unexplored as of yet. **Bell et al.** detected Bd in almost half of the species screened at two national parks in Gabon. Both parks were found to be Bd positive across all elevations and habitats, although no symptomatic frogs were encountered. This study presents the first evidence of Bd in

Gabon. In addition, **Savage et al.** report the first survey for Bd in Peninsular Malaysia. The authors detected Bd on 8% of sampled individuals, representing ten species, four families, and from four states. The authors suggest that management efforts should be implemented to limit spread of non-native Bd and protect the tremendous amphibian diversity in Peninsular Malaysia.

Considering that there is a wide diversity of species exposed to Bd, there is much variation in the disease outcomes such that some individuals and populations are able to co-exist with the fungus, while others succumb to disease. It turns out that amphibians in populations that co-exist with the Bd have sublethal infections on their skins. Some experiments and surveys show that symbiotic skin bacteria play a role in protecting amphibians from chytridiomycosis. **Lam et al.** show that Bd avoids bacterially produced metabolites, which may lead to low fungal loads on hosts.

## DISEASE MANAGEMENT IN SOUTHEAST ASIA

Most emerging diseases are zoonotic, and zoonotic diseases by definition occur at the interface of animal, human, and environmental health. As such, a multi-disciplinary approach will facilitate surveillance and control. A paper by **Grace et al.** reports on a scoping study for a project aimed at improving the management of zoonotic emerging diseases in South East Asia within an ecohealth framework. The authors interviewed 21 key stakeholders in Vietnam, Lao People's Democratic Republic, and Cambodia, many of whom are from the public sector and medical disciplines. The paper assesses the actors, linkages, activities, and capacities relevant to management of emerging zoonotic disease and makes the argument for ecohealth as a cross-cutting and integrating approach.

## HOLD THE ROPE SQUIRREL

Monkeypox virus is a serious smallpox-like illness that is endemic in Central and West Africa. **Fuller et al.** use active surveillance data to analyze potential monkeypox reservoirs including dormice, rats, and squirrels. The results suggest that the best predictors of human monkeypox cases are proximity to dense forests and associated habitat preferred by rope squirrels. The authors found that the risk of contracting monkeypox is significantly greater near sites predicted to be habitable for these squirrels. They recommend

that semi-deciduous rainforests with oil-palm, the rope squirrel's main food source, be prioritized for future surveillance with the goal of ultimately reducing monkeypox incidence in people.

## THE APE HEALTHSCAPE

The persistence of wild ape populations may be seriously threatened by infectious disease and other health hazards. It has been hypothesized that diseases which originate in or are spread by humans may be a substantial risk for long-term survival of wild populations. Respiratory disease outbreaks have been shown to be of particular concern for several wild chimpanzee study sites. **Lonsdorf et al.** use a historical dataset collected from 1979 to 1987 on chimpanzees at Gombe National Park, Tanzania to analyze the impact of a variety of human and non-human related factors on chimpanzee respiratory health. These findings are particularly discussed in the context of management options for the reduction of disease risk as well as the importance of long-term observational data for conservation.

## SWINE COUNTRY

After a period of low presence or near absence, feral swine populations have rapidly increased in eastern North Carolina, where most commercial swine facilities are found. Furthermore, exposure to swine brucellosis and pseudorabies virus has recently been documented in feral swine. In surveying 120 commercial facilities, **Engeman et al.** found nearly all facility operators knew feral swine were in their counties. However, physical inspections show higher immediate presence at facilities than operators had perceived and suggest a need to better secure possible access points to commercial stock by feral swine. The authors conclude that feral swine pose an increasingly higher disease transmission threat, warranting a stringent look at biosecurity and feral swine management around commercial facilities.

## HUMAN HEALTH

Ecosystem degradation has been shown to have a deleterious impact on physical and mental health. In this article, **Speldewinde et al.** examine the impact of dryland salinity on depression comorbid disease by analyzing georeferenced

health data. In more saline areas of Western Australia, the relative risk of asthma, ischemic heart disease, and suicide were found to be higher than in non-saline areas. The increased risk of these diseases is shown to be due to comorbid depression, highlighting the importance of incorporating mental health into any study of ecosystem degradation and human health.

The Canadian North is experiencing climate change through changes in precipitation, specifically in quantity, frequency, intensity, and duration. The resultant ecological changes continue to impact Inuit livelihoods and are likely to increase the risk of waterborne disease. **Harper et al.**

compared weather, water quality, and infectious gastrointestinal illness (IGI) data in Nunatsiavut. Meteorological stations captured weather data; water was tested for indicator bacteria; clinic records provided health data (2005–2008). Indicator bacteria were positively associated with rainfall and snowmelt; IGI-related clinic visits were positively associated with rainfall and snowmelt 2 and 4 weeks prior. This study is the first to systematically describe baseline data on weather, water, and health in Nunatsiavut and demonstrates the need for more high quality information to detect future impacts of climate change.