

In This Issue

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RESPONDING TO PANDEMIC EMERGENCE

Responding to outbreaks and pandemics is costing lives and livelihoods. **Nabarro and Wannous** call for a preventative approach that is built on resilient systems at the human, animal, and ecologies interfaces. It is essential to develop the capacity to anticipate, predict, and prevent dangerous pathogen from spilling-over to humans that causing pandemic threats and zoonotic diseases should be priority for risk assessment and reduction and management efforts.

ECOHEALTH SCOPE

Stephen et al. explore the question “can we judge ahead of time, the situations and circumstances where ecohealth is the best approach to use?” The authors seek to define a scope of practice for ecohealth by discussing how one might apply concepts of research evaluation and pragmatic philosophy to establish the broad area wherein an ecohealth practitioner can competently work.

RAT-ATOUILLE

A mixed qualitative and quantitative approach by **Bonwitt et al.** investigates hunting and consumption of rodents as risk factor for transmission of Lassa fever in several villages of Sierra Leone. In-depth interviews, focus group discussions and direct observations revealed that rodent consumption is widespread for a variety of reasons (taste, food security, and opportunistic behavior). A survey of 460 people revealed that 12% had caught rats in the last three months and are frequently bitten and urinated on. Preparation for consumption leads to contact with rodent blood

and viscera. Reluctance to talk about rat consumption implies that previous surveys need to be interpreted with care.

HAUNTING HANTAVIRUSES

Hantavirus Pulmonary Syndrome (HPS) is a severe disease caused by hantaviruses hosted in sylvan rodents. Several studies on habitat use and selection have highlighted the importance of vegetation on the abundance, distribution, and composition of the small rodent community in central-east Argentina. However, most of these studies have been conducted in agro-ecosystems, and little is known about the environmental and vegetation factors that influence the abundance and distribution of small rodent species in natural environments. **Vadell and Villafaña** provide valuable information about the ecology of sylvan rodent species in natural parks that could help prevent HPS in central-east Argentina.

A PLAGUE ON BOTH YOUR PRAIRIE DOGS

Sylvatic plague causes severe population declines in prairie dog populations in the western US and has the potential for spill-over to human populations and other wildlife species. Here, **Richgels et al.** review potential transmission pathways suggested in the literature and use a mathematical model to determine the contributions of each potential pathway to plague dynamics in Black-tailed prairie dog populations. The model agrees with previous literature that a short-term reservoir is needed to produce large-scale epizootics. However, the group found that the reservoir can be either infected, off-host fleas, or plague-killed prairie dog carcasses.

ANTHRAX IN MONTANA

This manuscript describes the results of an ecological niche model predicting the spatial distribution of *Bacillus anthracis*, the causative agent of anthrax, across Montana. **Morris and Blackburn** evaluated overlap between anthrax risk and the spatial distribution of wildlife and livestock and identified stakeholders. An extensive region of Montana characterized by anthrax risk that overlaps wildlife and livestock habitat on public and private land was noted in the results. The group makes recommendations for anthrax management strategies including wildlife surveillance in high-risk landscapes, livestock vaccination, accounting for potential public health threats to hunters, and a collaborative approach to management across stakeholders.

PANAMANIAN TICKS

Several outbreaks of tick-borne rickettsiosis caused by *Rickettsia rickettsii* have occurred in past and recent years in Panama. Many aspects of the bionomy of tick vectors are unknown in Panama, including basic data about the possible distribution of vector ticks. This work by **Bermúdez et al.** aims to provide initial data on which species distributed in rural villages and cities of Panama, through distribution models and maps. A molecular surveillance was performed to determine that *Rickettsia* species naturally infect ticks in the area.

COMPOSTING AND COYOTES

Composting is a popular and seemingly environmentally friendly practice. However, establishing unsecured piles of decomposing organic waste may aggregate wildlife to a reliable food source and expose them to harmful fungal toxins, promoting both parasite transmission and susceptibility. Here, **Murray et al.** show that industrial and residential compost piles were visited by urban coyotes, especially those with parasite infections, more frequently than urban natural areas, and were often contaminated with mycotoxins at concentrations above legal limits for animal feed. Securing piles of organic waste may be an important and underappreciated step in mitigating human-wildlife conflict and the spread of wildlife and zoonotic disease.

UNDER THE WEATHER

The incidence of legionellosis, caused by the bacteria *Legionella*, has been increasing in New Jersey. Time-series and case-crossover study designs were used by **Gleason et al.** to evaluate associations of legionellosis and temperature, precipitation, dew point, relative humidity, sea level pressure, wind speed, gust, and visibility. Time-series analyses indicated monthly relative humidity and precipitation were positively associated, while maximum temperature and visibility were inversely associated. Case-crossover analyses indicated relative humidity was positively associated, while sea level pressure and visibility were inversely associated. The results note that wet, humid weather with low barometric pressure may encourage the proliferation of *Legionella*.

THIS AIR IS A-POLLEN

The high prevalence of allergic rhinitis observed worldwide represents an important public health challenge. Environment, through the release of pollen and fungal spores, plays a key role. **Guilbert et al.** investigated the health impact of these aeroallergens based on their repercussion on allergy medication sales in the Brussels region (time-series analysis). Significant associations were observed for Gramineae (showing the strongest and the most consistent relationship), *Betula*, *Carpinus*, *Fraxinus*, *Quercus*. Strength of association varied according to age and gender. Conclusions will lead to improved disease management and open research perspectives regarding environmental change and its impact on respiratory disorders.

LIVER FLUKE INFECTION IN NORTHERN THAILAND

This study by **Ziegler et al.** demonstrates how a transdisciplinary learning approach provided new insights for explaining persistent *Opisthorchis viverrini* infection in northern Thailand, as well as elucidating problems of focusing solely on the parasite as a means of addressing high prevalence of cholangiocarcinoma.

ANTIFUNGAL RESISTANCE OF MANATEES

This manuscript by **Sidrim et al.** aims at evaluating the antifungal susceptibility and production of virulence fac-

tors by *Candida* spp. isolated from sirenians in Brazil. The isolates were recovered from the natural cavities of Amazonian and West Indian manatees and were tested for the susceptibility to antifungal medications and for the production of phospholipases, proteases, and biofilm. Since the natural cavities of manatees are colonized by resistant and virulent strains of *Candida* spp., these animals can act as sources of resistance and virulence genes for the environment, conspecifics, and other animal species, demonstrating the potential environmental impacts associated with their release back into their natural habitat.

THE COAST IS NOT CLEAR

This study by **Machado et al.** represents the first detection and quantification of co-occurring *Vibrio* species in West African coastal waters. All *Vibrio* species were detected in those waters showing higher concentrations by the end of the rainy season using the most probable number-polymerase chain reaction (MPN-PCR) approach. The results suggest that sea surface water temperature and salinity were the major environmental constraints controlling *Vibrio* species dynamics in the studied tropical coastal waters and that the persistence of human potential pathogenic *Vibrio* species in coastal waters highlights the potential human health risk.

WATER TEMPERATURE AND DISEASE PREVALENCE

The occurrence of emerging infectious diseases in wildlife populations is increasing, and changes in environmental conditions have been hypothesized as a potential driver. **Brand et al.** found that pathogen loads and host mortality due to an emerging virus were greater at higher temperatures for four amphibian species. The group also found that a subtle 2°C change affected disease outcomes. The results indicate that changes in water temperature due to climate change could play a role in the emergence of ranaviruses.

BD BURDEN

Clare et al. studied chytridiomycosis, caused by the fungal pathogen *Batrachochytrium dendrobatidis*, and found that widely used data obtained via epidermal swabs provide valuable information on fungal load dynamics, indicating

that infection severity is an important predictor of mortality. However, this method does not provide an accurate representation of the true infection burden of an individual and therefore using swab-based infection thresholds, which are becoming more widely applied, could be misleading.

Petersen et al. conducted a survey for *Bd* on 15 Department of Defense installations across three United States and during two sampling periods and provided a range of variation in geography, habitat types, climate, and species diversity. The group investigated how variables such as latitude, season, temperature, and precipitation impact the prevalence and intensity of *Bd*, and the results offer a standardized continental-level template over which more concentrated local sampling efforts can be overlaid.

Stoler et al. studied how the leachate and substrate of leaf litter inputs to freshwater wetlands alters the growth and sporulation of *Bd* and found that both litter substrate and leachate depress *Bd* densities. Effects of litter species varied by several orders of magnitude and were generally correlated to litter phenolic acid concentrations.

AMP DEFENSE

By testing how antimicrobial peptides (AMPs) influence both the survival of trematode infectious stages prior to infection as well their ability to establish within amphibian hosts, this study by **Calhoun et al.** helps to test whether AMPs can help to explain variation in infection among species or life stages. Findings showed that all five tested trematodes exhibited decreased survival in response to AMPs isolated from adult bullfrogs, no effect of AMPs from first- or second-year bullfrogs regardless of the concentration and the use of norepinephrine to remove AMPs of amphibian species yielded only weak or non-significant effects on infection success by *Ribeiroia ondatrae*.

MONKEY SEE, MONKEY EAT

Tapanes et al. describe predation on bats by *Cercopithecus* monkeys in two East African forests. Their observations raise the possibility of a disease transmission route involving primate consumption of an infected bat carcass. Humans and chimpanzees eat *Cercopithecus* and disease transmission via predation on bats may be important in understanding the ecology of zoonotic disease, possibly including Ebolavirus.

INFLUENZA A AND PIGS

Influenza A is a constantly evolving virus, with risks to both animals and humans. Waterbirds, the natural hosts, are found in many different environments around the world and, in Australia, follow a more nomadic way of life fol-

lowing ephemeral resources around the continent. Feral pigs are living in a large number of habitats across Australia and are also hosts of influenza A. The serological evidence in this study by **Dalziel et al.** shows that feral pigs are being exposed to influenza A and may provide a surveillance tool for the future.