

In This Issue

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TB OR NOT TB

Tuberculosis (TB) in cattle and wildlife reservoirs impacts public health, livestock production and conservation, worldwide. **Boadella et al.** report on TB monitoring using a new diagnostic tool in wild boar (*Sus scrofa*) that has implications for several scientific fields and stakeholders. Their results provide evidence of a new geographic range of TB and a stable prevalence in this reservoir, which contrasts with the success of bovine TB control in cattle. The authors provide insight into the apparent range expansion of wild boar TB, and analyze the factors driving its epidemiology. Wild boar TB emergence in non-endemic regions urgently needs to be taken into account to avoid a future scenario resembling the current situation in south-central Spain.

THIS LAND IS OUR LAND

Ecological consequences of modern agriculture, as well as their sustainability and impacts on human health have not received adequate attention in India. This study by **Sarkar et al.** provides a comparative analysis of the effects of older and newer paradigms of agricultural practices on ecosystem and human health within the larger context of sustainability. Modern agriculture emphasizes rice cultivation that is supported by extensive and indiscriminate use of agrochemicals, and irrigation. Over time, these methods have changed the local landscape and vegetation, and importantly have also augmented the mosquito population, a potential vector for malaria, Japanese encephalitis, and other diseases. However, public perceptions of the importance or existence of adverse environmental effects of agricultural practices are lowest in the heavily irrigated areas.

Although land use change is recognized as a driver of emerging diseases, the mechanisms linking land usage and infection often remain quite speculative. To determine how interactions at multiple spatial scales influenced pathogenic infections in amphibian hosts, **Hartson et al.** sampled wetlands along a gradient of agricultural and forested land use in Wisconsin, USA. While land use predicted parasite abundance and richness, these effects were mediated by influences at both the local (wetland) and regional (biogeographic) scales. These results underscore the importance of including spatial scale in studies of infectious disease and the importance of the emerging field of spatial epidemiology.

TAR BALLS AHOY!

The Deepwater Horizon Oil Spill, the largest oil spill in USA history, released nearly 5 million barrels of crude oil into the Gulf of Mexico. Soon after the spill began, tar balls, and other forms of weathered oil washed up in large numbers on beaches in Mississippi and Alabama. In this study, **Tao et al.** analyzed tar balls collected from public beaches in Alabama and Mississippi following the spill for bacterial counts, as well as for the presence of *Vibrio vulnificus*. *V. vulnificus* is a human pathogen known to be abundant in the Gulf Coast environment and is capable of causing severe wound infections through contact with contaminated surfaces. Counts of *V. vulnificus* were significantly higher in tar balls than in sympatric, simultaneously collected sand and seawater samples. These results implicate tar balls as a reservoir for *V. vulnificus* in beach environments along the Gulf Coast of Mexico and demonstrate the need for public health action.

WATERY WAYS OF TRANSMISSION

In this study, **Banakar et al.** analyzed the spatio-temporal distribution of an estuarine bacterium, *V. vulnificus*, in the Chesapeake Bay. Retrospective predictions (1991–2005) of the probability of *V. vulnificus* occurrence in the Chesapeake Bay were made using a previously developed empirical model specific to the Bay. Using this prediction system, the authors identified the geographic locations in Chesapeake Bay where environmental conditions coincide with the preferred physical habitat of *V. vulnificus*. Potential “hotspots,” which showed a high probability of *V. vulnificus* occurrence, are highlighted in this article. Ecological predictions such as this may yield an improved understanding of environmental conditions associated with occurrence of *V. vulnificus* in the Chesapeake Bay.

Cholera is a concern worldwide, especially with the close connection to water issues. According to data obtained from the Azerbaijan Ministry of Health, there was an upward trend in cases of cholera in Azerbaijan during 1978–1998. A paper by **Gurbanov et al.** analyzes the data through the 20-year period and finds that the incidence of cholera cases ramped up with each increase in air temperature. The authors present this new data summary, which may assist in development of a global prediction model for cholera.

A paper by **Jing et al.** outlines major water management challenges and local coping strategies in the context of rapid agricultural intensification, water shortages and endemic fluorosis in Yuanmou County, China. In this complex and multi-dimensional context, their research found that the traditional measures taken by local government departments to control fluorosis and other water-related health issues were inadequate and ineffective, with the sustainability of some coping strategies being questionable. The article presents an EcoHealth framework for water management and provides valuable new knowledge for readers who are interested in the area of ecology and health policy, and human health and water management practices in rural China.

FROM PAPER INTO PRACTICE

The handful of papers discussed above presents opportunities for future interdisciplinary action between scientists and policymakers using the ecohealth perspective. The ecosystem approach to health and researcher–policymaker

interactions may be guided by the three principles of (1) transdisciplinarity, (2) participation, and (3) social justice and gender equity. In this issue’s Forum piece, **Koné et al.** discuss how these concepts came to life through Ecohealth training and solid waste management case studies in West and Central Africa.

WANT A HANTA

Hantaviruses are rodent-borne pathogens transmissible to humans. In this issue, **Blasdell et al.** conducted a seroprevalence study in rodent populations originating from Thailand, Laos and Cambodia. The authors detected serological evidence of exposure to hantaviruses in most trapping sites, with the seroprevalence varying between 0 and 5.6% depending on factors such as rodent species, geographical origin, and rodent species richness. Remarkably, molecular tests also allowed the detection of the first hantavirus in Laos, a new variant of Seoul virus.

SECRET’S IN THE SKIN

Populations of *Atelopus zeteki*, commonly known as Panamanian golden frogs, have collapsed due to a recent chytridiomycosis epidemic. This disease, regularly published on in *EcoHealth*, has been linked to population declines of over 200 amphibian species. Past studies have shown that *Janthinobacterium lividum*, a frog skin bacterium, can prevent chytridiomycosis in two North American amphibians due to its production of the anti-Bd metabolite violacein. In this study, **Becker et al.** found that experimentally treating *A. zeteki* with *J. lividum* failed to prevent chytridiomycosis, most likely due to the inability of *J. lividum* to persist on the skin of *A. zeteki*. To build upon these findings, future research will focus on isolating bacterial species more compatible with the living conditions of *Atelopus* skin.

SIZING UP THE ENEMY

Animals with recent infections often have increased pathogen loads and are highly infectious. As a result, recent infections may therefore be associated with increased disease transmission or elevated health risks for nearby human communities. Assays measuring antibody binding strength are appealing tools to rapidly identify recent infections in

wildlife. However, these assays may be confounded by antibody titer because assays may misclassify low titers as recent infections and consequently overestimate number of recent infections. **Varner and Dearing** examined an assay for identifying recent hantavirus infections in deer mice. All measures of assay performance dramatically improved by controlling for antibody titer. Based on these findings, the authors offer recommendations for development of these assays in new host–pathogen systems.

Coxiella burnetii is the bacterium that causes query fever, or “Q fever.” In this issue, **Bennett et al.** report that this zoonotic bacterium has been detected through qPCR

and DNA sequencing in feces from endangered western barred bandicoots (*Perameles bougainville*), in a tick (*Haemaphysalis humerosa*) that is parasitic to these bandicoots. Anti-*C. burnetii* antibodies have been demonstrated to exist in plasma/sera collected from these bandicoots. How *C. burnetii* came to exist on two remote arid islands is considered by the authors, as well as the public health risk for human visitors to the islands is explored. The authors also discuss the danger of inadvertently translocating potentially serious and zoonotic diseases during animal translocations.