Bird Flu Research at the Center for Tropical Research

by John Pollinger, CTR Associate Director

Effects of Avian Migration and Human-induced Change on the Distribution and Transmission Risks of Avian Influenza

The Center for Tropical Research was recently awarded a four-year project from the National Institutes of Health/National Institute of Allergy and Infectious Diseases (NIH/NIAID) entitled "*Effects of Avian Migration and Anthropogenic Change on the Distribution and Transmission Risks of Avian Influenza*." This research effort targets migratory landbirds in North, Central, and South America and is in partnership with:

- Institute for Bird Populations (IPB) which is coordinating three bird banding station networks for avian surveys - the Monitoring of Avian Survivorship and Productivity (MAPS) network, the Monitoring Avian Winter Survival (MAWS) network, and the Monitoreo de Sobrevivencia Invernal - Monitoring Overwintering Survival (MoSI) network (*sample collection*)
- UCLA's High Speed, High Volume Laboratory Network for Infectious Diseases in partnership with Los Alamos National Laboratory (*sample characterization*)
- UCLA School of Public Health, Department of Epidemiology (*human surveillance*)
- Johns Hopkins Bloomberg School of Public Health (human surveillance)
- NIH/NIAID Laboratory of Infectious Diseases (*characterization methodologies for avian influenza*)

This project will examine the role that North American migratory passerines (perching birds and most songbirds) play in the dispersion of avian influenza strains between breeding sites in Canada and the U.S. and wintering sites in Mexico and Central and South America. Although anthropogenic changes (human-induced habitat disturbances) are known to be the primary drivers of numerous infectious disease outbreaks and emergence events, the impact of global anthropogenic change on the wildlife ecology of diseases remains under-studied. Terrestrial birds may share the same habitat as poultry, which may make them more effective transmitters of disease to humans than aquatic species such as waterfowl. Evidence suggests that prevalence in other avian species, notably passerines, may have been greatly underestimated.

Migratory Passerines

Common Yellowthroat

Wilson's Warbler

Swainson's Thrush

Nashville Warbler

Yellow-breasted Chat

By mapping the geographic distribution of viral strains onto migratory pathways, it will be possible to evaluate how anthropogenic environmental changes affect the prevalence and transmission dynamics of avian influenza strains between migratory birds and non-migratory species associated with humans. In addition, patterns of transmission between birds and humans will be examined.

Utilizing remote sensing data, we will determine the environmental variables that are most closely associated with the prevalence of avian influenza and develop models that will aid in the prediction of how anthropogenic changes in habitat will affect transmission dynamics between migratory species, between migratory and resident species, and between birds and humans at wintering, breeding, and migratory stopover sites.

To carry out this research, UCLA has assembled a multidisciplinary team of scientists with expertise in avian field ecology, molecular genetics, parasitology, epidemiology, ecological modeling, high-throughput laboratory technology, and remote sensing. Survey efforts will begin in late 2006 at MoSI stations in Mexico and Central America. We expect to collect and analyze approximately 20,000 bird cloacal swab samples (samples from the common opening in birds through which the intestinal, urinary, and reproductive tracts empty) per year from across the Americas.

Can outbreaks of H5N1 be predicted from migration routes?